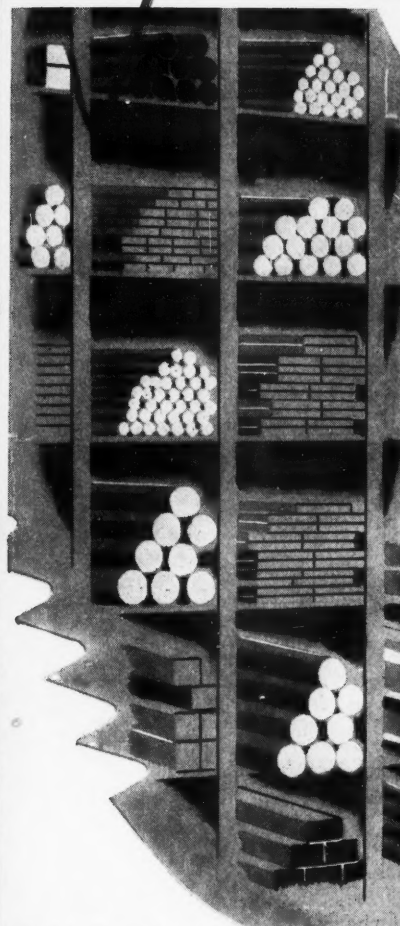


MODERN

February, 1948

Machine Shop



LENOX

POWER

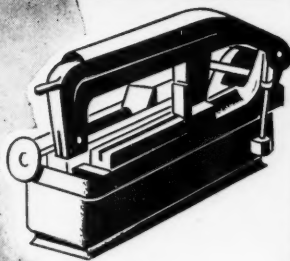
HACK SAW BLADES

are adaptable for

use on **ALL TYPES**

HACK SAW MACHINES

in sawing **ALL METALS**

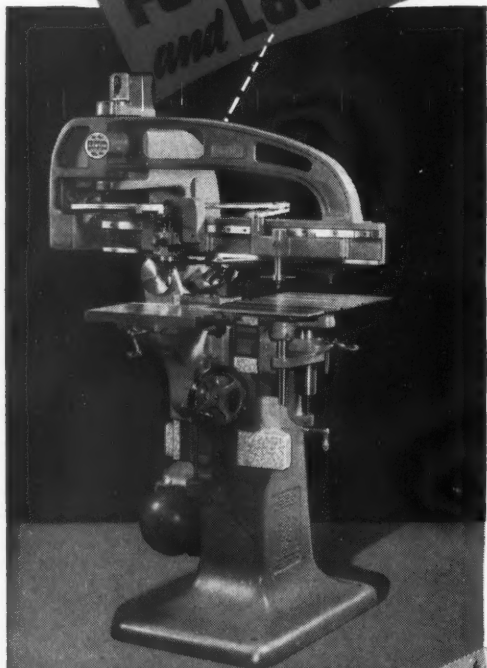


AMERICAN SAW & MFG. COMPANY

SPRINGFIELD, MASSACHUSETTS, U. S. A.

✓R v.203 Feb.-May 1948

**Another New
GORTON
For Finer Work
and Lower Costs**



GEORGE



**GORTON
MACHINE CO.**

50 YEARS OF PATENTED TOOLS

A NEW MACHINE CO. MACHINE WORKS, U.S.A.



the P13 PANTOGRAPH for 3-Dimensional Light Milling and Engraving

This revolutionary machine features the new and exclusive *RATIOBAR Tracer Control—the first basic design improvement in pantograph construction since the first pantograph was built. Manufacturers of small intricate dies, molds, hobs, stamps and other related products placed firm orders sufficient to take all of the first production run after inspecting the pilot model—real proof of the value built into the P13.

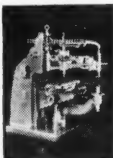
What is *RATIOBAR tracer Control?

*RATIOBAR Tracer Control is the name for the newly developed principal of control, found only on the Gorton P13. It does three important things: permanently aligns the pivot center, cutter spindle and tracing style in an absolute straight line without guessing or innumerable adjustments; enables the operator to set reduction ratios with just one slider block; it provides rigid support for all pantograph linkages. No other manufacturer offers these advantages in a pantograph.

Easier operation and better balance are also assured with the *RATIOBAR because linkages move toward the pivot center as the tracer moves out and away from it. For detailed information, use coupon below.

OTHER MODELS FOR OTHER WORK

The new Gorton P13 is just one of a family of cost-cutting, precision pantographs. Your requirements may call for the 3-L — largest 3-Dimensional Pantograph available today, the 3-U or 3-Z for light or medium milling and engraving in 2 dimensions, or you may require special adaptations or tooling. Our Engineering Service is ready to serve you without obligation.



FREE... COMPLETE INFORMATION. Data on the new Gorton P13 as well as other Gorton pantographs. Write for Bulletin 1580 today.

PLEASE SEND WITHOUT OBLIGATION
Bulletin No. 1580 - 1702

Name.....
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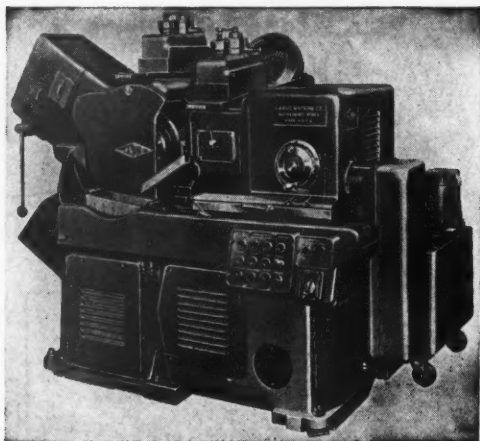
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No. 1 Centerless Thread Grinder

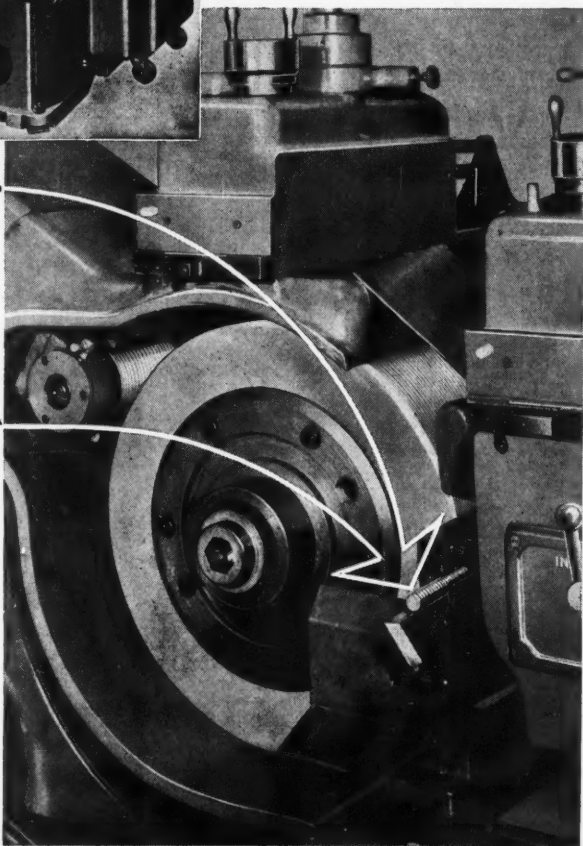
210 STUDS PER HOUR

Centerless Thread Ground
by the "Thru-Feed" Method

Name of Part Stud
Thread Specifications:
Diameter $\frac{3}{4}$ "
Pitch 10 USF
Thread Length 4"
Thread Tolerance . Class 7
Production per Hour . 210

The LANDIS No. 1 Centerless Thread Grinder is designed to grind screw threads on straight cylindrical workpieces and headed or multiple diameter parts. Workpieces without interfering shoulders requiring threads on the maximum diameter only are ground by the "thru-feed" method, headed or shouldered workpieces by the "infeed" method. Either process will grind threads from the solid or finish grind precut threads.

Write for Bulletin E-97



LANDIS MACHINE CO.
WAYNESBORO, PA., U. S. A.



Another **COMPLETELY NEW** Heald Bore-Matic with Double-End Capacity!

● **Faster cycles. Constant speeds. Simplified operation.** These and many more exclusive features make the Heald Model 322 a completely new Double-End Bore-Matic—compact in size, but big in capacity.

Borize your medium-sized parts on it. It does more in a minute than you ever imagined. Arrange it with multiple spindles at either end for large, awkward work. It bores, turns, faces, chamfers, grooves, fly cuts—with greater power in the cutting and a higher precision in the finish.

The Model 322 is only

one of an entirely new line of Heald precision finishing machines—Bore-Matics, Internal Grinders, Surface Grinders—eighteen in all, and each one completely new. There are years of engineering experience behind them—years of uninterrupted, cost-cutting production ahead. The Heald branch office in your part of the country will be glad to give you complete details.

SEND FOR BULLETIN on this Heald Model 322 Bore-Matic and on its smaller double-end partner, the Heald Model 222.



THE HEALD MACHINE COMPANY, Worcester 6, Mass.

Branch Offices in Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York



PRECISION
GEARS

FOR SMOOTH POWER FLOW IN MACHINE TOOLS

Farrel-Sykes continuous tooth, herringbone gears transmit power in a smooth, constant flow that protects accuracy in machine tool operation.

Precision generation of these gears by the famous Farrel-Sykes method, giving accuracy of tooth contour and tooth spacing . . . uniform distribution of the load on each tooth and across the entire face . . . balancing of axial thrusts by the opposed helices . . . are factors which assure efficient power transmission, quiet operation and long gear life.

They are known as the *Gear with a Backbone* because the two helices meet to form continuous teeth instead of being separated by a center groove. This *backbone* provides extra strength and high load-carrying capacity in small space.

Farrel-Sykes gears are available in any size up to 20 feet diameter for practically any industrial application. Complete information will be supplied promptly, on request.

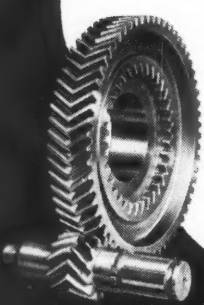
FB-319

FARREL-BIRMINGHAM COMPANY, INC.

344 VULCAN ST., BUFFALO 7, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston,
Pittsburgh, Akron, Chicago, Los Angeles,
Tulsa, Houston.



Farrel-Birmingham



This Stainless Steel Collection does 89 mph!



MANNED by a crew of four, this Olympic bobsled chassis has an estimated speed in excess of 89 mph. Note the ingenuity of design. The P-shaped hand rails serve as pushers, then swing in and lock to protect the crew. Instead of rope and drum, the sled is steered by standard auto gear. All parts are bolted for knockdown shipment.

The sled is built of 18-8 stainless steel throughout. Completely assembled, it includes round bars, hexagons, flats, sheets, tubing, pipe—even fittings. Yet every bit of stainless used was ob-

tained—overnight—from a nearby Frasse warehouse.

It pays, when you're working with stainless, to work from Frasse stocks. The wide range of sizes, shapes and analyses available from this single source is a time and effort saving convenience. Call or write for our latest inventory. *Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissabickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore*



FRASSE

*for
Stainless Steels*

**BARS • SHEETS
PLATES • STRIP
TUBES • PIPE
ANGLES • WIRE**

Count these advantages of ABRASIVE CUTTING

Versatile—Annealed or unannealed steel of any analysis, brass, bronze, monel, ceramics, phenol plastics, glass, tungsten tantalum carbide—these and many other materials efficiently cut abrasively.



Fast—Abrasive cutting is usually many times faster than other methods. Additional finishing operations may be eliminated.



Accurate—Clean cuts can be made to within a tolerance of a few thousandths of an inch. No surface hardening.



Safe—Campbell machines are designed with every precaution for the safety of the operator. There is no safer type of cut-off machine.



Economical—Savings in time, material and tools are possible with abrasive cutting—proved on many production lines.

Adaptable—The Campbell line of abrasive cutters includes models for many different types of cutting.

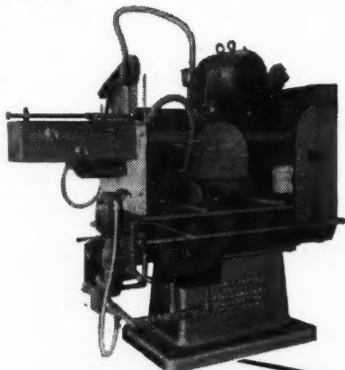


Simple—Cutting abrasively does not require skilled operators. Full automatic models still further simplify production.



Proven—Campbell machines offered today are the result of many years of experiment, improvement and refinement. They have stood the final test of production line use.

Manual, semi-automatic and full automatic—dry and wet abrasive cutters are included in the Andrew C. Campbell line. Write for details.



CAMPBELL
Abrasive Cutters
and Nibbling Machines

ACCO



ANDREW C. CAMPBELL DIVISION
AMERICAN CHAIN & CABLE

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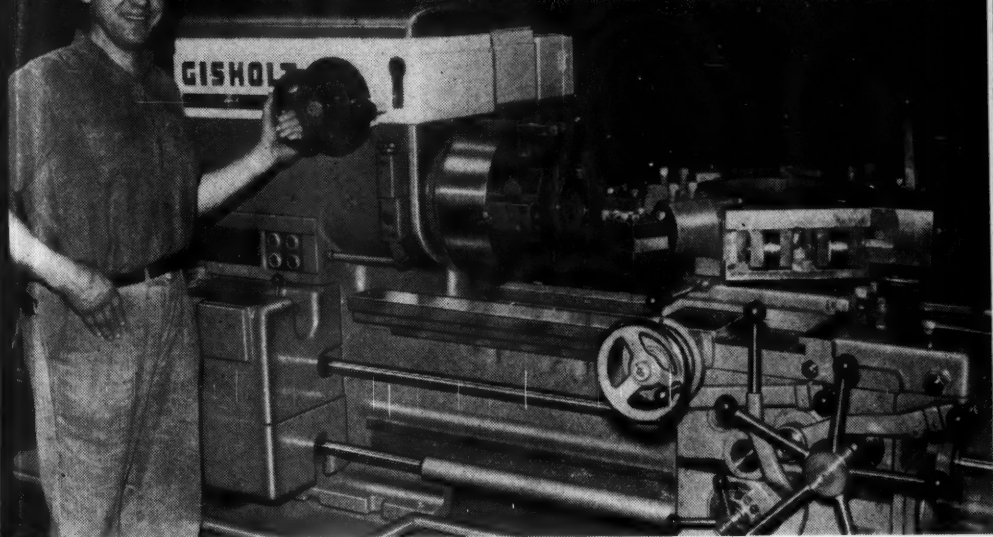
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**"I like to PRODUCE
...not work problems"**



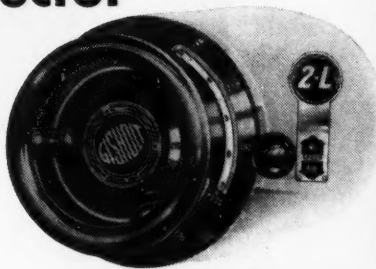
the GISHOLT Speed Selector does the figuring!

No wonder turret lathe operators like the Gisholt Speed Selector. Without it, here is what they have to do to get the proper spindle speed:

1. Take the diameter to be cut and multiply it by 3.1416 to get the circumference.
2. Refer to tables to get the proper cutting speed in feet per minute for the material, based upon depth of cut, tooling and feed.
3. Divide cutting speed by circumference at cutting point to figure the proper spindle r.p.m.
4. Get the spindle revolving at that speed by means of manual control.

All this the Gisholt Speed Selector eliminates. The operator merely turns the hand wheel to the diameter of the cut. The machine automatically responds with the proper spindle speed.

Nobody wants to do it the hard way any more. That's why the Speed Selector is now standard equipment on Gisholt Turret Lathes.



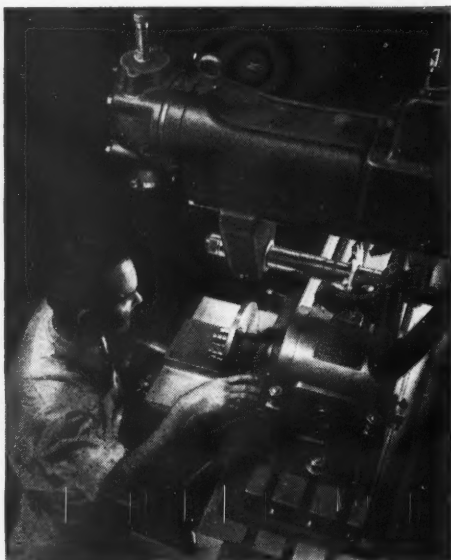
THE HYDRAULIC SPEED SELECTOR, now standard on Gisholt Turret Lathes, is another important improvement in the interests of greater production and lower machining costs. Ask for complete information.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and semi-round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 3, Wisconsin



*This attachment
increases volume
of milling box
110%

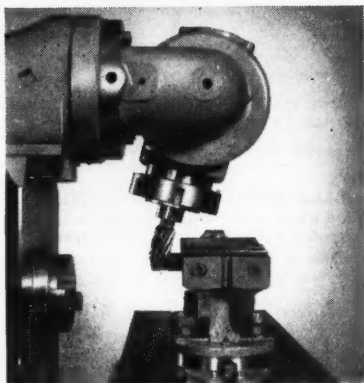
Above: A conventional setup. This overarm attachment, incidentally, has a single swivel head.



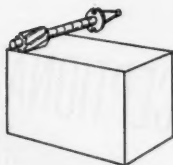
Above: CINCINNATI Motor Driven Universal Over-arm Milling Attachment. A self-contained unit, it is always in place; does not interfere in the least with normal usage of the machine; has nine speeds 100 to 1030 rpm



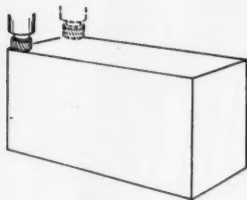
Right: In this illustration, the spindle carrier has been swiveled toward the column to mill the rake angle of a planer tool.



*110% for CINCINNATI No. 2 MI. Other types in proportion to the specifications.



Volume of "milling box," No. 2
MI Plain Miller without attachment.



Volume of "milling box," No. 2
MI Plain Miller with attachment.

Left: Rotary milling the end of a bushing. Here the attachment is used for vertical milling operations.

● Every milling machine has a "milling box." It's the volume of the imaginary box in which chips can be cut, and is obtained by multiplying table traverse by vertical traverse by maximum cross adjustment of cutter position.

You can greatly increase all these capacity dimensions on your CINCINNATI knee-type milling machine with a CINCINNATI Motor Driven Universal Overarm Milling Attachment.

These attachments have a double swivel arrangement which swings the cutter spindle $7\frac{1}{2}$ " either side of the machine spindle, adding 15 inches to the reach of the cutter beyond the table traverse. In the vertical position, the attachment spindle nose is several inches above the machine spindle, adding an appreciable amount to the height of the cutter above the upper limit of vertical traverse. Adjusting the overarm from the innermost to the outermost position traverses the attachment spindle beyond the cross traverse cutting range of the machine. A CINCINNATI No. 2 MI Milling Machine, for example, gains 110% in volume of milling box. ¶ CINCINNATI Motor Driven Universal Overarm Milling Attachments may be applied to any CINCINNATI Milling Machine having a "rectangular" overarm (i. e., one which slides in dovetail ways). Complete data may be obtained by writing for catalog M-1213.

THE CINCINNATI MILLING MACHINE CO.

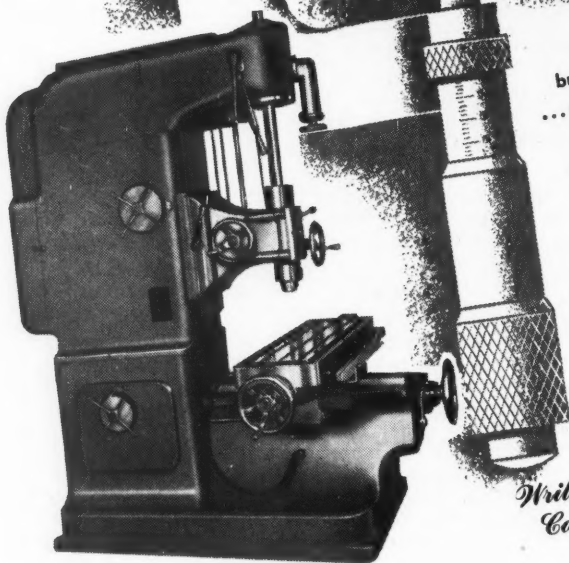
CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES

EXCEPTIONAL ACCURACY, SPEED AND POWER

No. 50 PRECISION BORING AND VERTICAL MILLING MACHINE

- ★ Reduces Set-Up Time To A Minimum
- ★ Eliminates Time-Wasting Work Transfers
- ★ Multiple Operation On A Single Machine
- ★ Greater Output At Lower Unit Cost



The No. 50 is a machine built for precision as well as speed ... with unusual ability to handle an extreme range of different and difficult jobs. Simple and convenient to operate — ruggedly constructed for many years of tough, trouble-free service — the Knight Miller offers worthwhile savings in greater output, lower production costs and improved quality of work.

*Write for Complete
Catalog Details*

Sixteen spindle speeds, 40 to 2,000 r.p.m. • 9 spindle feeds, .005" to .010" • 100" table traverse per minute in both directions • 16 table feeds, $\frac{1}{16}$ " to 20" per minute • 7½ h.p. drive.



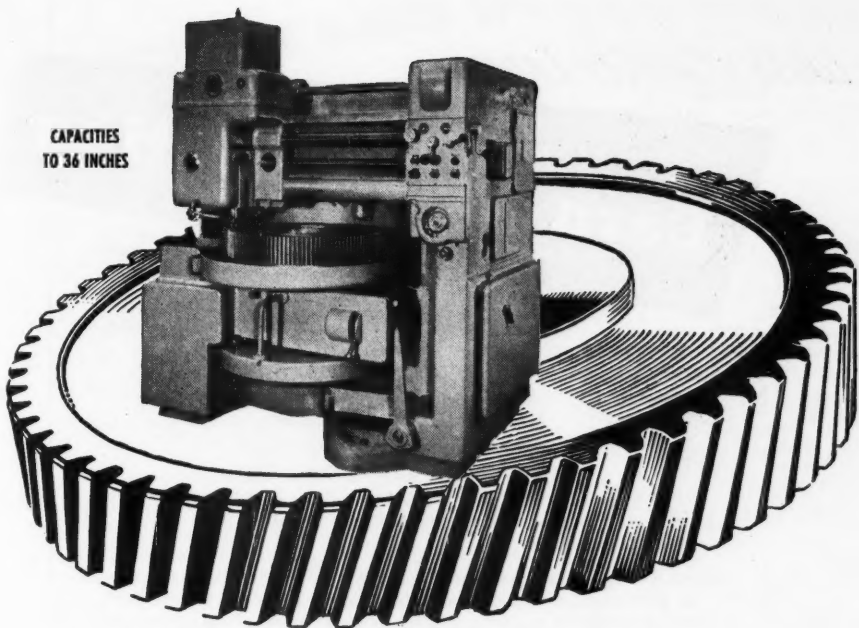
W.B. KNIGHT

MACHINERY COMPANY

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3920 WEST PINE BLVD. • ST. LOUIS 8, MISSOURI

CAPACITIES
TO 36 INCHES



IN GEAR CUTTING

QUALITY COMES FIRST ... then LOW COST

Precision is a tradition with Fellows...that is why you are always certain of high-quality gears when they are generated on the Gear Shaper. Machines, such as the new 36-inch "All-Purpose" Gear Shaper, assure exact duplicating accuracy at the lowest possible cost per piece. Again, your Gear Shaper never asks for "Time off" for it can be used for such a wide variety of work. Bulletins are available on a complete line of Gear Shapers with capacities up to 100 inches.

Fellows

The Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Building, Detroit 2; 640 West Town Office Building, Chicago 12; 7706 Empire State Building, New York 1.

LODGE & SHIPLEY LATHES

Earn "very good" rating



.... from NOTED ENGINE BUILDER

Lodge & Shipley Lathes are used to make "all types of tools and fixture parts" for the production of Diesel engines at the American Locomotive Company, Auburn, N. Y.

In the photo, a boring bar is shown being machined on a 20" Lodge & Shipley Engine Lathe, used for turning, boring,

facing, and other typical operations in this plant. Heat treated tool steels are used . . . close tolerances are required.

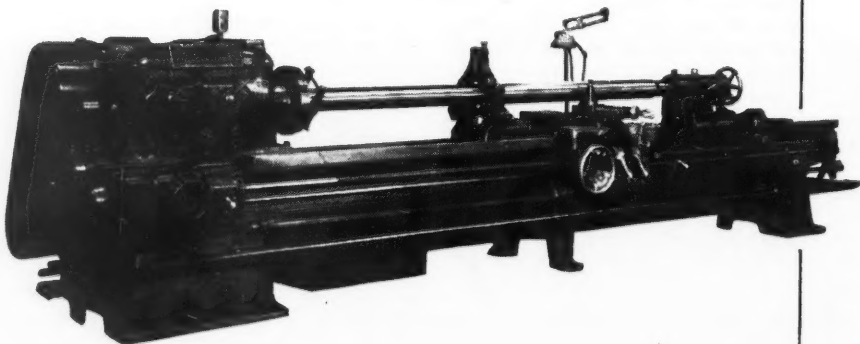
Designed specifically to set new standards of accuracy, production and smooth operation, this lathe represents the ultimate in modern lathe design. Instantly selected threads and feeds, combined with a wide range of spindle speeds, allows the user complete freedom in obtaining maximum production.

Bulletin 503 describes and illustrates fully all the advantages of this lathe . . . new from headstock to tailstock.

ENGINE
TOOL ROOM
MANUFACTURING
OIL COUNTRY
DUOMATIC (AUTOMATIC)
LATHES
TURRET LATHES

THE Lodge & Shipley COMPANY

MACHINE TOOL DIVISION • 3055 COLERAIN
SPECIAL PRODUCTS DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO



PRODUCTION TIME SLASHED 84%

H-P-M did it!



You don't need a sharp pencil to figure the expert cost-cutting job this H-P-M FASTRVERSE Press did for the Jaeger Machine Company, Columbus, Ohio. On this one job alone, drum heads for concrete mixers, H-P-M piled up an almost unbelievable record for Jaeger.

Look at these facts — operation changed from "hot" to "cold" eliminating furnace expense . . . press operations reduced from 2 to 1 . . . manpower requirements from 4 to 1 . . . production time slashed from 6 minutes to 1 — an 84% cut! Actual press time only 12 seconds per part!

You can save dollars with H-P-M FASTRVERSE Presses on *your* metal working jobs. They're noted for their ability to get the job done quicker—better—and at lower cost. Write today and get the facts.

THE HYDRAULIC PRESS MFG. CO.
1048 Marlon Rd. • Mount Gilead, O., U.S.A.
Branch Offices in New York, Cincinnati, Cleveland, Columbus, O., Detroit, Pittsburgh and Chicago. Representatives in other principal cities. Export Dept.: 500 Fifth Avenue, New York, N.Y.
Cable—"Hydraulic"

See for yourself how H-P-M FASTRVERSE Presses can speed up production and cut your costs. Send for your copy of Bulletin 4706.

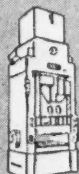


All-Hydraulic
Self-Contained

Metal Working Presses

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

WHEREVER YOUR PRODUCTION
CALLS FOR PRESSURE PROCESSING
H-P-M EQUIPMENT
DOES IT BETTER—FASTER—AT
LOWER COST



DOUBLE-ACTION
DRAWING PRESSES



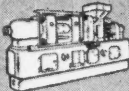
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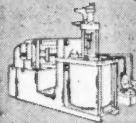
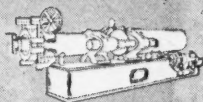


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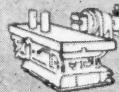
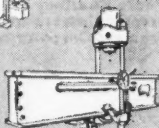
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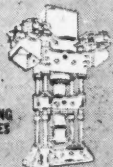


DIE CASTING
MACHINES

STRAIGHTENING
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FORGING
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Write for
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THESE H-P-M PRESSES

FOSDICK HIGH SPEED DRILLS

**for fast,
accurate
drilling,
reaming,
counter-
boring**



Photo Courtesy of
Fairchild Camera and
Instrument Corporation



Fairchild Cameras are precision instruments requiring exceptionally accurate machine work. FOSDICK 6- and 4-spindle High Speed Drills are used extensively for drilling—reaming and counterboring various parts of these instruments.

The battery of 4-spindle High Speed Drills shown are drilling shutter housings for large F-56 camera. These are but a few of the jobs handled by FOSDICK High Speed Drills in this plant. Cases—cones—lens—shutter housings—film magazine parts—all are handled by these high speed drills for precision holes from

0.16 inch to $1\frac{1}{4}$ inch.

The tolerances maintained range from .002 inch for drilling—.0005 inch for reaming and .001 inch for counterboring.

This battery is only one of thousands of FOSDICK High Speed Drills now operating in hundreds of plants producing precision work. Where they have been engaged in war production, they can and are being quickly converted to producing peace-time products.

For full particulars write for the FOSDICK High Speed Drill Bulletin M.S.H.S.

FOSDICK

MACHINE TOOL CO.
CINCINNATI 23, OHIO

GEMCO

NEW MODEL UNIVERSAL SHAPER



IN SIZES from
16" to 36" incl.

"HAS WHAT IT TAKES"

3

ADDITIONAL

NEW

**Features for Cutting Costs...
Increasing Production...**



In this New Model Universal Shaper, GEMCO engineers have incorporated these 3 new, additional features—

1. Built-in Power Rapid Traverse—combines both horizontal and vertical selective feed and power movement to the Work Table.
2. New ease in operation—4-way control of Table feeds now easily accomplished by simple gear shifting device located at operator's side of machine.
3. Re-located Oil Pump and Filter—readily accessible from the outside of the Shaper.

These new, additional features add up to a still wider adaptability, and greater ease in operation, all of which mean that you save time, cut costs, and increase production.

..and It's LUBRIGARD Protected!



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ST. LOUIS 16, MO.

Manufacturers of Precision
Machinery Since 1917

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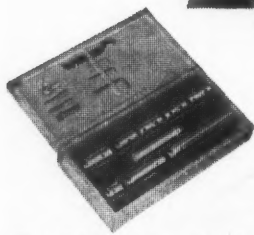
THE **Adjusto**

THE SINGLE
BORING BAR
for all your boring

For use on any Boring, Milling,
Turret, or Automatic Screw Machine, and
designed for practically all boring in
manufacturing operations.



For the first time, complete rigidity in an adjustable bar is assured by ADJUSTO's special-design dovetailed section in the head. This section, operated by #40 ground and hardened screw, slides on ground and polished surfaces thus eliminating inaccuracies caused by wear.



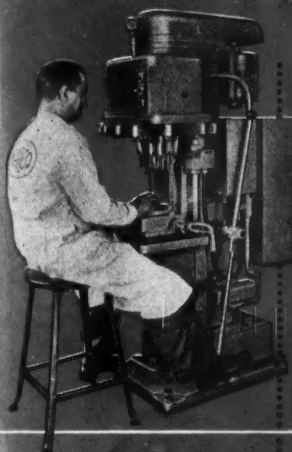
Each Adjusto set is packaged in convenient plywood container designed for ease in handling and safe storage.

- 1 MICROMETER ADJUSTMENT....accurate to .0001"
- 2 ANY LENGTH BORE.....up to 21"
- 3 ANY DIAMETER BORE.....up to 16"
- 4 USES STANDARD SQUARE TOOL BITS

Your inquiries welcome—Send for full particulars

J-W. SALES CO., INC.
822 FRICK BUILDING
PITTSBURGH 19, PA.

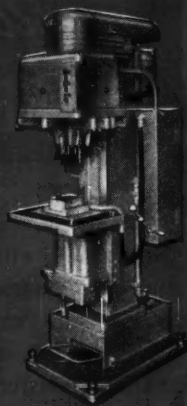
Investigate **NATCO** first... for the "HOLE" story in Light Sensitive High Production Drilling or Tapping



A complete line of close control, high speed machines for sensitive drilling or tapping multiple holes in small work in cast iron, steel, aluminum, plastic or wood.

♦ **A-33A** Combination Hand and Foot and Air Oil Feed Machine for both light precision drilling and tapping.

A-33B Air Feed Machine used primarily for light precision tapping. A-33A & A-33B machines available with or without air operated rotating table.

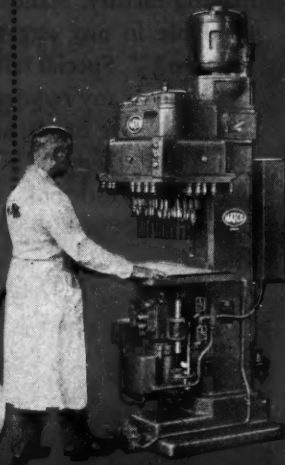
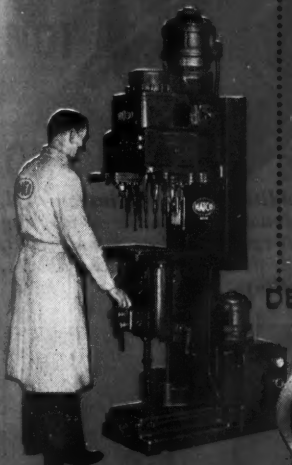


♦ **G-5** Arranged with 12 spindles for drilling and tapping small or medium sized work. Hand & foot or hydraulic feed tables.

G-6 Similar to G-5 except has larger hand area, 24 spindles and 3HP drive motor and larger work table.

Write today for details on
the A-33 Bulletin 247 and G-5
and G-6 Bulletin 522

**NATCO DRILLING, BORING,
TAPPING and FACING MACHINES
DETROIT PUBLIC LIBRARY**



NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.
Branch Offices: 1809 Engineering Bldg., Chicago • 409 New Center Bldg.,
Detroit • 1807 Elmwood Ave., Buffalo • 2902 Commerce Bldg., New York City

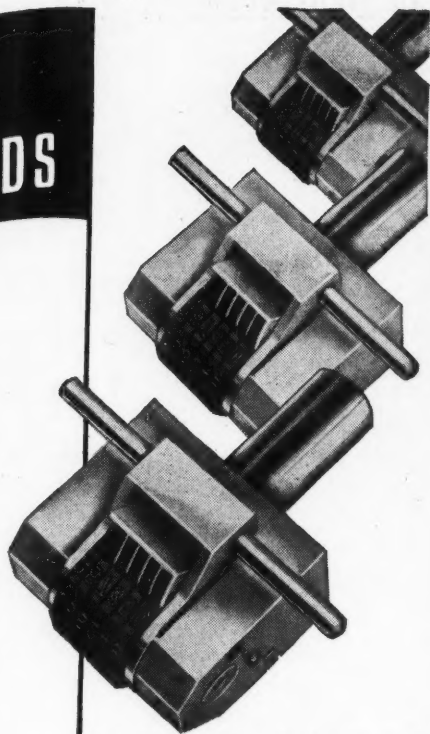
Call a Natco Field Engineer

STANDARD OF THE MARKING INDUSTRY

NOBLEWEST

Automatic NUMBERING HEADS

Noblewest automatic numbering heads are guaranteed to be the finest obtainable. Produced from specially selected steel, every part is precision made by master craftsmen in a plant equipped with every modern tool-making facility. Standard models are available in any size numbers from 1/40" to 1/2". Special numbering heads are made to any requirements including embossing heads, and numbering heads combined with dies. Write to Noble & Westbrook Manufacturing Company, 25 Westbrook Street, East Hartford 8, Conn.



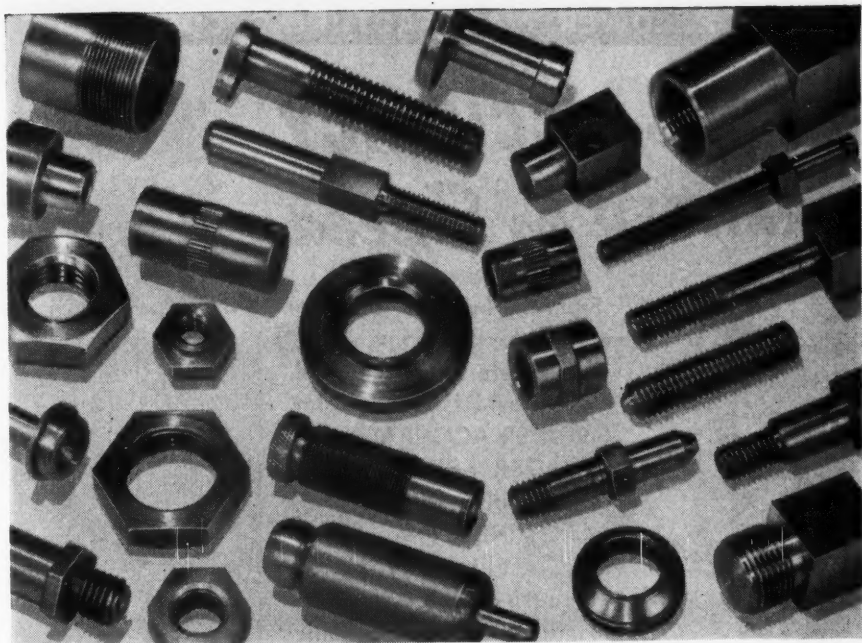
In addition to numbering on steel, Noblewest automatic numbering heads can be used on other metals, wood, fiber, hard rubber, plastics, and alloys.

MARK IT
BEST WITH

NOBLEWEST
IMPROVED
MARKING
DEVICES

NOBLEWEST

EQUIPMENT FOR MARKING • GRADUATING • EMBOSSING • NUMBERING



NOT A SINGLE CAM CHANGE NEEDED *To Make All of These Parts* ON A WARNER & SWASEY 5-SPINDLE AUTOMATIC

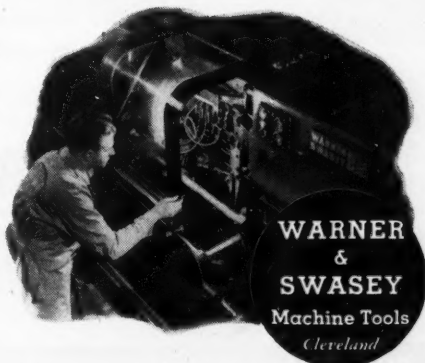
★ Nearly 300 different parts are produced on a Warner & Swasey 5-Spindle Automatic at Electric Controller & Mfg. Co., Cleveland.

★ *Not a single cam change* is required to produce this variety of jobs.

★ Patented "Quick Set" mechanism eliminates all expense of designing, machining, storing and finding cams, and time-taking setup.

Call your Warner & Swasey field representative.

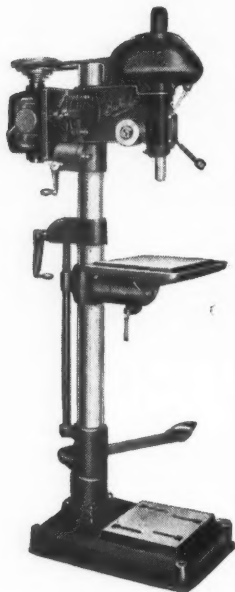
***You can machine it better, faster,
 for less...with a Warner & Swasey***



TURRET LATHES, MULTIPLE AND SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

FOR LOWER MANUFACTURING COSTS

RIGID *for* **ACCURACY** **ARRANGED** *for* **Speed**



Buffalo No. 18
Drill

From the heavy 4" diameter column to the sliding head, all parts are heavy-duty and precision-fitted to foster **GREATER ACCURACY** and **LONGER SERVICE LIFE**. Drilling with a "Buffalo" No. 18 is **HANDY**, too—all controls intelligently placed where the operator can reach them easily — sliding table and speeds quickly adjustable for real savings in set-up time. The No. "18" will give you "lower cost holes" on jobs up to 1" diameter. Twelve models, bench and floor types, single and multiple spindle. Bulletin 3123-B is yours for the writing.

BUFFALO **FORGE** **COMPANY**

388 BROADWAY

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**MACHINE
TOOLS**

by

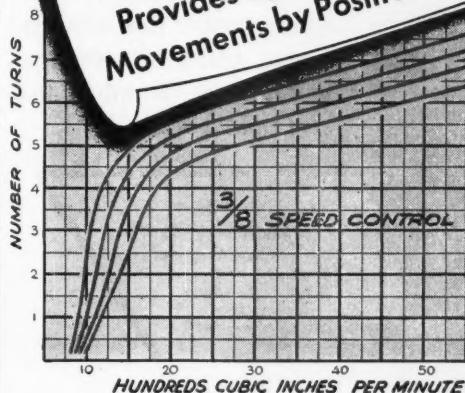
Buffalo

- ★ BACK SPOT
FACERS
- ★ BAR CUTTERS
- ★ BENDING ROLLS
- ★ BILLET SHEARS
- ★ DOUBLE END
PUNCHES AND SHEARS
- ★ LOCOMOTIVE
SHEARS
- ★ MILL TYPE
SHEARS
- ★ RAPID ACTING
PUNCHES
- ★ SINGLE END
SHEARS
- ★ SPRUE CUTTERS
- ★ STRUCTURAL
IRON WORKERS
- ★ UNIVERSAL
IRON WORKERS
- ★ DRILLS FOR THE
PRODUCTION LINE —
DRILLS FOR THE
TOOL ROOM

CONTINUOUS SERVICE — FASTER OPERATION — PEAK ACCURACY

ROSS Speed Control VALVE

Provides Split-Second Timing of Piston
Movements by Positive Control of Air Flow



Available in sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ "

With air flow regulated by screw action, changes in volume take place with constant progression—not a series of "steps"—but with micrometer accuracy. Control of the air flow is absolute—from zero to maximum.

Simple—dependable—rugged. Only two moving parts—stem and poppet.

Write for bulletin which gives information on different sizes and applications.

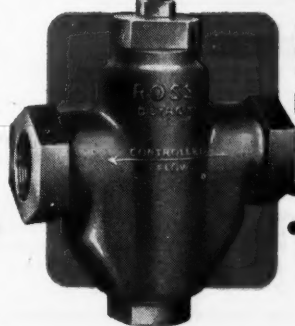
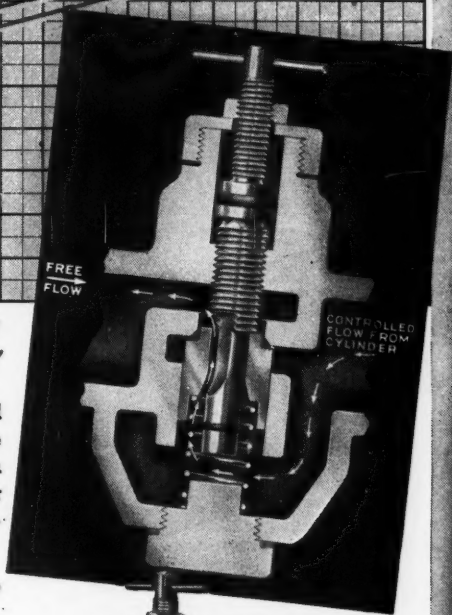
ROSS
Air Control
VALVES



THE BRIDLE FOR AIR HORSEPOWER

ROSS
Operating
VALVE CO.

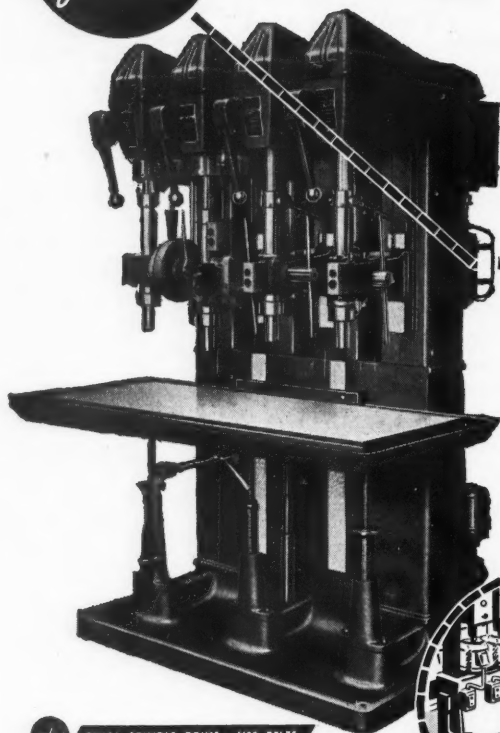
6484 Epworth Boulevard
DETROIT 10, MICHIGAN



ONLY 2
MOVABLE
PARTS
•STEM
•POPPET

Avey's
PLUS
features

add up to **TOP PRODUCTION**



Each spindle of AVEY BMA-6 is individually motor-driven by standard frame constant speed motor. Foot-mounted motor easily interchanged or replaced. Standard motors can be stocked.

AVEY TYPE BMA-6

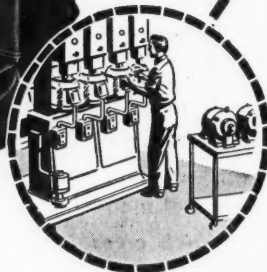
Four Spindle—12" Overhang

1st spindle—Avey-matic feed

2nd spindle—Plain power feed

3rd spindle—Hand feed

4th spindle—Tapping (reversing motor)



Single to six spindle machines, equipped with hand feed, power feed or reversing motor tapping.



plus

FINAL SPINDLE DRIVE—VEE BELTS

Vee belt used on final drive from gear box to spindle. Increases speed and sensitivity in drilling. Carries full horse power from motor to job.

plus

SIX SPEED CHANGES

On the AVEY BMA-6 six speed changes are made through selective, sliding gears. This automotive type of gear shift is controlled by a single lever at front of machine. Provides versatility and effective operation.

plus

SPEEDS OBTAINED—SLIDING GEARS

Selective, sliding gears of AVEY BMA-6 change speeds quickly and easily. Each gear is manufactured and finished by accurate, modern process, shaved, hardened and lapped. Insures smooth operation and long performance.

CLIP AND MAIL TODAY

AVEY DRILLING MACHINE CO.,
CINCINNATI 1, OHIO

4

Gentlemen: Please send without obligation your new Bulletin 647.

COMPANY _____

ADDRESS _____

NAME _____

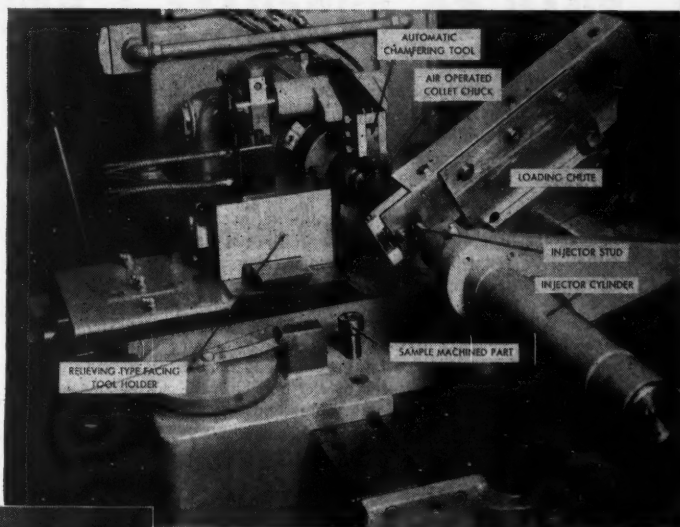
Avey DRILLING MACHINES
CINCINNATI, OHIO

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

AUTOMATICALLY LOADED IMP LATHES CUT MANUFACTURING COSTS

Automatic Loading enables the machine to produce to its full mechanical efficiency by eliminating the human equation.



Problem: To finish face and chamfer bore of pump gear true with bearing diameter.

Solution: A Lo-swing IMP Lathe was fitted with an injector type automatic loader which provides a fast, completely automatic cycle, entirely eliminating hand loading.


Partially machined pump gears are placed in a loader chute and fed by gravity to the loader injector arm which picks up in the bore of the spindle and places the part in an air operated collet chuck.

A relieving type tool block on the front slide performs the facing operation, then is automatically relieved during the return stroke to avoid spiral tool marks. The chamfering operation is done with a swinging type tool block on the headstock, automatically operated by a cam mechanism working in conjunction with the front cross slide. On completion, the pump gear is automatically ejected by a plunger located in the bore of the spindle.

Lo-swing Lathes fitted with Automatic Loaders are usually grouped together in series of two or more, since one operator can easily service several machines. Let Seneca Falls engineers help cut your turning costs.

PRODUCTION COSTS ARE LOWER WITH S

HERE IT COSTS LESS TO CONVERT

from this  *to this* 

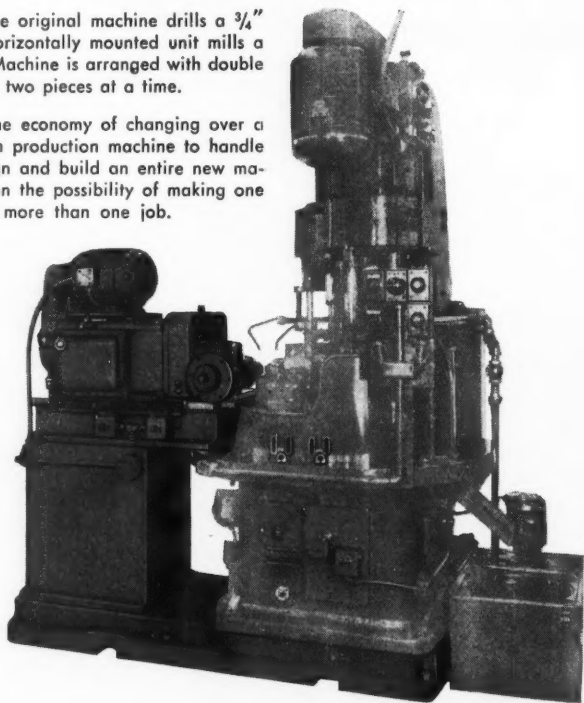
THAN TO PURCHASE A NEW MACHINE

● With the addition of a new base-column—and hydraulically operated milling head, this original vertical drilling machine was converted from drilling, reaming and facing holes in water outlet castings to drilling and milling operations on fan mounting brackets.

The vertical hydraulic unit on the original machine drills a $\frac{3}{4}$ " hole in the bracket while the horizontally mounted unit mills a 1.015"-1.025" slot in the work. Machine is arranged with double holding fixtures to accommodate two pieces at a time.

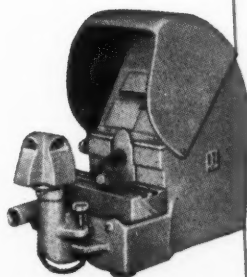
This additional unit illustrates the economy of changing over a more or less single purpose high production machine to handle another job rather than to design and build an entire new machine. Why not consult Morris on the possibility of making one of your machines adaptable to more than one job.

MORRIS has the experience, engineering "know-how" and facilities to assist you in making an economical conversion or to develop a high production machine for drilling—reaming or facing operations.



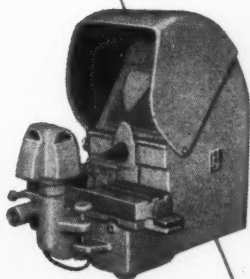
The **MORRIS** *Machine Tool Co.*

CINCINNATI 3, OHIO



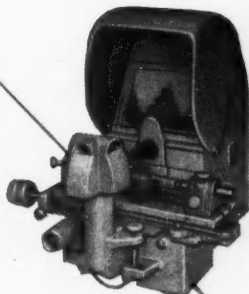
New Model BC-7A ★

This Model has a 12" plain table. It is used for comparing the magnified shadow of an object with a master outline. Commonly used for inspecting such parts as knitting needles and sinkers on a production basis, it can handle objects up to 3" diameter, at magnifications ranging from 5 to 125.



New Model BC-7B ★

This Model has a 14" table that can be compounded for inspecting objects with helices. It is for rapid and accurate inspection, by comparison, of screw threads and other irregular shaped parts. Objects up to 3" diameter and 11" between centers can be inspected at magnifications from 5 to 125.



New Model BC-7C ★

Standard Bench Model with 16" table equipped for making lateral measurements. The table can be compounded for projecting objects with helices. Objects up to 3" diameter and 11" between centers, can be inspected at magnifications ranging from 5 to 125. This Model is used to inspect a great variety of objects, such as hobs, taps, small tools, threaded parts, calculating machine parts, automatic telephone parts, instrument gages, dental instruments and thousands of others.

The NEW Jones & Lamson BC-7 Bench Optical Comparator offers you a choice of three different table assembly combinations. This enables you to choose the model best suited to your needs, and obtain . . . *at lowest cost . . . the finest in Optical Comparators.*

These models are the outcome of more than twenty-five years experience in the field of inspection by optical projection. They are designed to cover an almost unlimited range of inspection work — from precision products of the tool room through a diversity of industrial parts and products requiring a method of inspection that is at the same time accurate and rapid.

Our engineers are inspection specialists, their knowledge of holding fixtures, handling methods and suitable comparator equipment, qualify them to study your inspection problems and make recommendations that will improve your profit picture. They have for others. Call, write or wire for their service today.



JONES & LAMSON MACHINE COMPANY
Springfield, Vermont, U. S. A.

Manufacturers of: Universal Turret Lathes · Fay Automatic Lathes · Automatic Double-End Milling and Centering Machines · Automatic Thread Grinders · Optical Comparators · Automatic Opening Threading Dies and Chasers · Ground Thread Flat Rolling Dies

Jones & Lamson

OPTICAL COMPARATORS

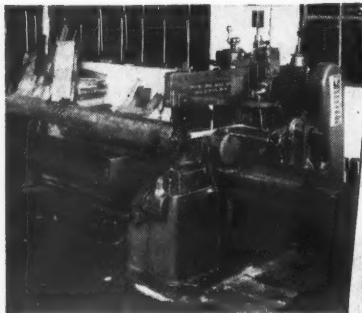
WHICH IS BETTER FOR YOU, HACK SAWS OR BAND SAWS?

Reading Chain & Block Corporation found the answer by contacting the MARVEL field engineer. Only a MARVEL engineer could analyze this problem without bias because only MARVEL makes both hack saws and band saws. As a result, Reading bought three different types to most efficiently handle their metal sawing. A No. 6A machine for production cutting of identical pieces, a No. 4B machine for fast, accurate, miscellaneous cutting, and a No. 8 band saw machine for cutting of structurals, mitering, and other miscellaneous work.

Whatever your metal sawing problem, there is among MARVEL'S 11 different series of sawing machines, a saw or saws that will exactly meet your needs. Your local MARVEL Engineer will gladly study your sawing problems, make recommendations and quote prices.



No. 8 MARVEL Metal Cutting Band Saw. This most versatile saw takes work up to 18" x 18", mortises, miters or roughs to shape.



No. 6A MARVEL Production Saw (world's fastest) automatically feeds, measures and cuts off identical pieces from nested or single bars up to 6" x 6" cross section.



No. 4B MARVEL High Speed Saw is a moderate priced, very fast 6" x 6" capacity saw. Here it ideally meets the requirements of the maintenance department.

READING CHAIN and BLOCK CORPORATION

TELEPHONE 6600

Manufacturers

Materials Handling Equipment

CRANES - CONVEYORS - ELECTRIC HOISTS - RIGGING CRANES - RIGGING SYSTEMS

READING, PA. U.S.A.

October 24, 1947

Armstrong-Blum Mfg. Company
3700 West Bloomingdale Avenue
Chicago, 39, Illinois

Gentlemen:

We have in our shop three Marvel Saws which are used all day in production work for the cutting of materials in connection with the manufacture of hoists and cranes. Since these three saws have been used in our plant the cost of cutting materials has been greatly reduced, and the speed at which the materials are cut has been increased to such a point that we no longer have any "overruns" due to the lack of materials.

We plan to assure you at this time that when we need more automatic saws in our plant, we will definitely give you first consideration to install the Marvel Saws in our plant.

Whenever it has been necessary for any repair service, or engineering service, to be applied to these saws, we have never had to wait that has kept us in production to this date. That is one thing again, assuring you that your services and attention to our requirements have been very satisfactory, we remain,

Very truly yours,

READING CHAIN & BLOCK CORP.

Frank M. Howard

Frank M. Howard
Purchasing Agent

F. H. H. H.

MARVEL SAWS
Better Machines - Better Blades

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago 39, U. S. A

ANOTHER *Plus* FEATURE . . .

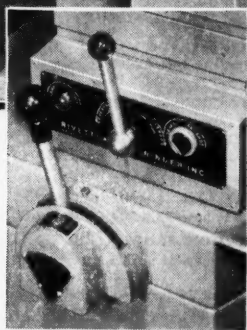
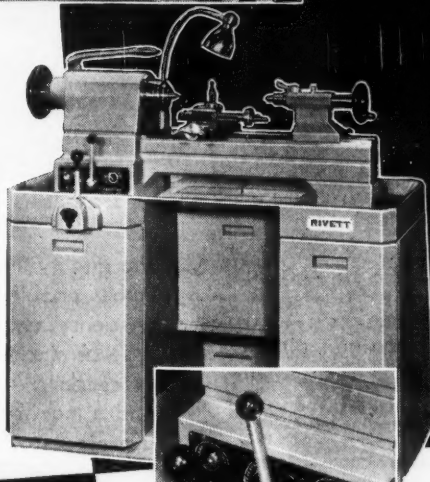
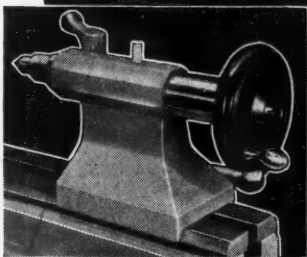
OF THE NEW **RIVETT**
918S PRECISION CABINET LATHE

DOUBLE-BEVEL WAYS AND MAXIMUM BEARING AREA!

See the hardened and precision-ground steel bed with double-bevel ways for alignment. In combination with the wide top surface they provide maximum bearing area for slide rest shoe and tailstock. The self-centering action of the double-bevel ways safeguards tailstock from wearing away from cutting tool out of alignment.

Double-bevel ways assure against the inherent weakness of any type of bed which depends upon front bearing only for alignment. In such construction wear is lateral against a narrow bearing area and away from cutting tool which makes for taper turning between centers. This out of alignment also produces off-center (oversize) drilling and reaming.

On double-bevel ways the tailstock may be operated in conventional fashion, slid at will along the bedways and locked in desired position by slight finger touch on the eccentric binder. Binding force is self-centering and downward against a large bearing area.



SPINDLE SPEED SELECTION

Correct spindle speed for any operation. Control lever affords any speed from 80 to 3700 r.p.m. Selected speed shows on dial.

RIVETT LATHE & GRINDER, INC.

BRIGHTON • BOSTON
MASS. • U. S. A.

South Bend 9" Precision Lathes

\$145⁰⁰
AND UP

f. o. b. factory, less electrical
equipment and bench.

You can buy a South Bend 9" Lathe on time payments.



FEATURES AND SPECIFICATIONS

9" x 3' South Bend
Model A Bench Lathe

SWINGS—9¼" over bed and saddle wings

BED LENGTHS—3, 3½, 4 and 4½ feet

DISTANCE BETWEEN CENTERS—
16 to 34 inches

SPINDLE SPEEDS—

Six—41 to 658 r. p. m.

Twelve—41 to 1270 r. p. m.

Sixteen—46 to 1176 r. p. m.

POWER LONGITUDINAL FEEDS—

Model A Lathes—48, .0015" to .0853"

Model B Lathes—26, .0021" to .0155"

Model C Lathes—14, .0021" to .0156"

POWER CROSS FEEDS—

Model A Lathes—48, .0004" to .0252"

Model B Lathes—23, .001" to .0046"

THREAD CUTTING RANGE—

Model A Lathe—48 pitches,
4 to 224 per inch

Models B and C Lathes—45 pitches,
4 to 160 per inch

MAXIMUM COLLET CAPACITY—½ inch

The quality that is built into South Bend 9" Precision Lathes enables them to produce quality work with efficiency under all conditions. Regardless of the type of machining—between-centers, collet, fixture, or chucking—close tolerances can be maintained and a maximum volume of fine work produced with a minimum of effort.

Write for Catalog 9-J which fully describes and illustrates all South Bend 9" Precision Lathes and attachments.

SPEED PRODUCTION WITH THESE ATTACHMENTS

COLLET ATTACHMENTS

TAPER ATTACHMENT

MILLING ATTACHMENT

ELECTRIC GRINDER

CARRIAGE STOPS

HANDLEVER BED TURRET

DOUBLE TOOL CROSS SLIDE

SQUARE TURRET

CENTER REST

FOLLOWER REST



BUILDING BETTER LATHES SINCE 1906

SOUTH BEND LATHE WORKS

427 EAST MADISON STREET • SOUTH BEND 22, INDIANA

THE NEW THOR CHIPPERS ARE

BIG NEWS

IN AIR TOOLING

NEW streamlined design
... weight is *behind* piston to absorb kick-back.



THREE SIZES!

NO. 11—1" Stroke; Weight 12 lbs.;
Length, 12¾"

NO. 22—2" Stroke; Weight 13 lbs.;
Length, 14¼"

NO. 33—3" Stroke; Weight 14½ lbs.;
Length, 15¾"

NEW design air ports deliver constant power even at reduced air pressures for faster, harder blows... new large drop forged handle.


Write today for information or call a Thor branch for demonstration

INDEPENDENT PNEUMATIC TOOL COMPANY

600 West Jackson Boulevard, Chicago 6, Illinois
BRANCHES IN PRINCIPAL CITIES

Thor **PORTABLE POWER**
TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS



Brightboy

shapes to contour -

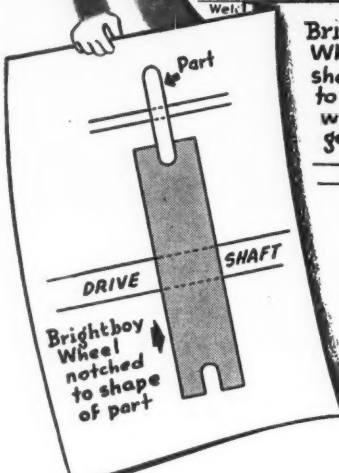
BURRS

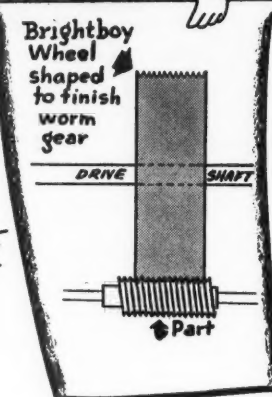
FINISHES

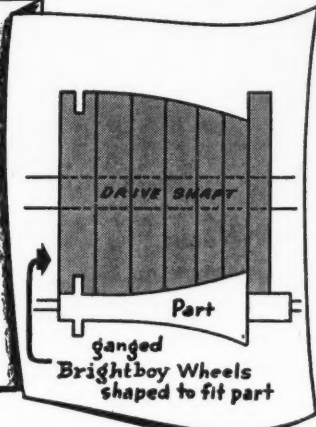
SMOOTHES

POLISHES

-In One Operation







BRIGHTBOY INDUSTRIAL DIVISION

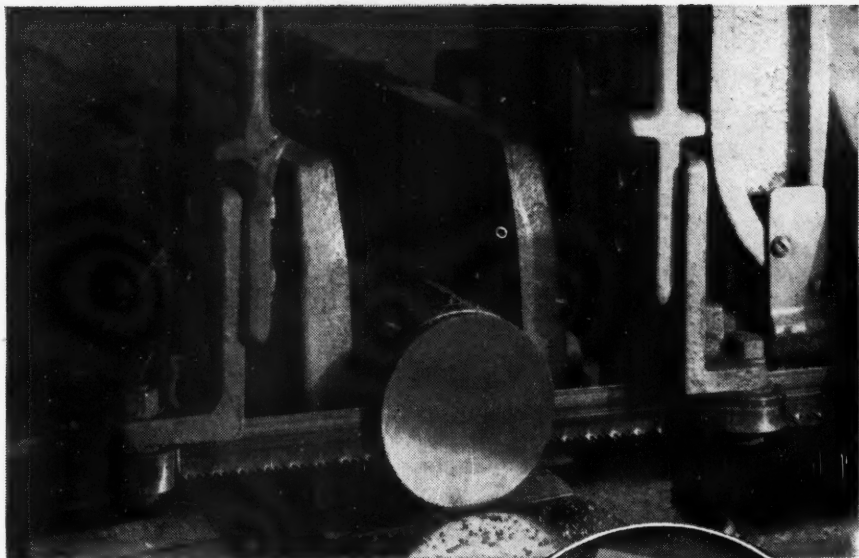
**Weldon Roberts Rubber Co.,
Newark 7, N. J.**



Jobs involving finishing of faces, edges, threads and other shapes frequently are finished in one operation through Brightboy's outstanding work-versatility.

Quick, simple arrangement or shaping of the wheels, "ganged," beveled, or cut to fit the part, achieve single operation contour finishing because of the combined action of Brightboy's rubber and abrasive.

Write for a Brightboy service engineer to call and suggest production short-cuts on your job; ask your dealer for the Brightboy catalog-manual and prices.



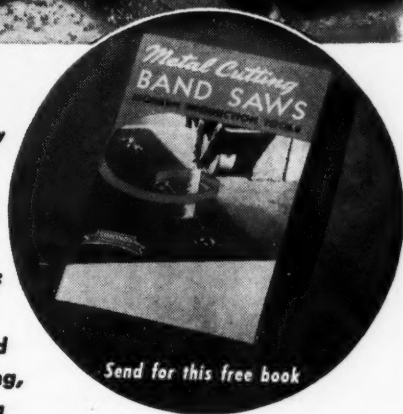
Climb on the **SIMONDS** "BAND-SAW WAGON"



**Save Thousands of
Hours by Band-Saw
Cutting . . . instead
of Shaping, Milling,
Turning, Drilling**

Getting to be a "Big Parade" . . . the way shops are swinging to metal band-sawing . . . and keeping their one-purpose machines free to do the work for which they were designed. Simonds Metal-Cutting Band Saws can do a score of jobs, and do them all at top speed and accuracy . . . cut-off work, contour cutting, and cutting of irregular shapes like jigs, dies, fixtures, as well as heavy straight production cuts . . . and many other similar jobs.

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. **Canadian Factory:** 595 St. Remi St., Montreal 30, Que.



And Simonds Metal Bands earn top profits on these jobs because they're made to *stay* on the job many hours longer . . . running smoothly, easily, cleanly. Simonds special steel, perfect tooth-milling and even tooth-set . . . those are the Simonds *extras* that *pay you extra* on every Simonds Metal Band you buy. Order from your distributor today.



**YOU FURNISH
THE STEEL**



LYON WILL MAKE THE PRODUCT

... and you get prompt delivery!

● If you can supply us with 12 to 24 gauge sheet steel, we will buy the steel from you and supply you pound for pound with any selection of Lyon standard products now in production—at regular published prices. (See partial list below.)

Or, we will manufacture to your specifications, in Lyon production run quantities, assemblies, sub-assemblies, or parts in gauges No. 8 and lighter up to No. 30.

LYON METAL PRODUCTS, INCORPORATED
GENERAL OFFICES: 239 MONROE AVENUE, AURORA, ILLINOIS
Branches and Dealers in All Principal Cities

A PARTIAL LIST OF LYON PRODUCTS

- | | | | | | | |
|------------------------|---------------------|-------------------|--------------------|--------------|-----------------|---------------------|
| • Shelving | • Kitchen Cabinets | • Filing Cabinets | • Storage Cabinets | • Conveyors | • Tool Stands | • Flat Drawer Files |
| • Lockers | • Display Equipment | • Cabinet Benches | • Bench Drawers | • Shop Boxes | • Service Carts | • Tool Trays |
| • Wood Working Benches | • Hanging Cabinets | • Folding Chairs | • Work Benches | • Bar Racks | • Mopper Bins | • Desks |
| • Economy Locker Racks | • Welding Benches | • Drawing Tables | • Drawer Units | • Bin Units | • Parts Cases | • Stools |
| | | | | | | • Sorting Files |
| | | | | | | • Ironing Tables |

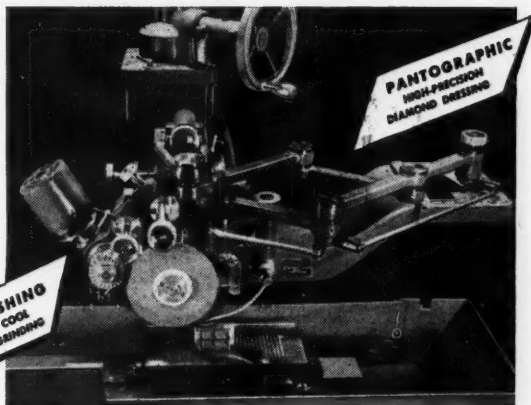
Now you can combine roll-crushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

Here's how this 2-in-1 machine does it:

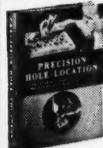
1. Combines Pantograph, working directly from template, and Roll-Crushing in one device, accurately related to spindle.
2. Switches from one method to the other without disturbing workpiece setting or location of either truing device.
3. No setting up of complex attachments each time wheel is dressed... no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device... crusher method saves diamond costs.
4. Assures highest roll-crushing accuracy and economy. Crusher roll is ground and used on same spindle, without disturbing position... no expensive machine required to grind crusher roll... no worry about hardening distortion, because roll is ground in place from the solid directly from template.



5. Takes Skill out of job, yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.
6. Device need not be removed to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

MOORE SPECIAL TOOL CO., Inc.
730 UNION AVENUE, BRIDGEPORT 7, CONN.



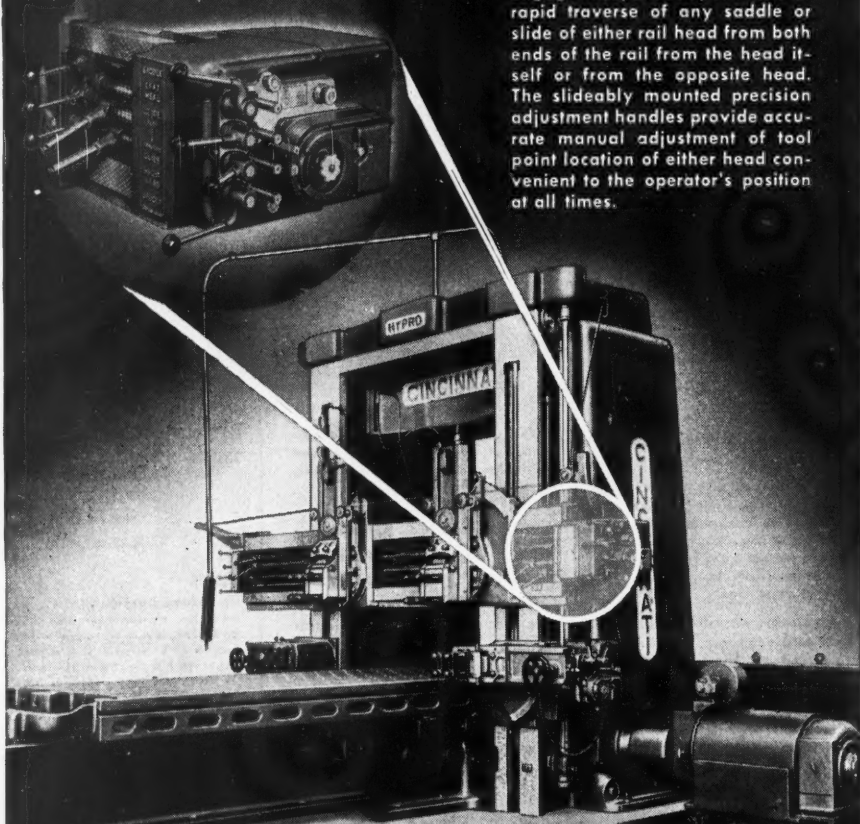
**HAVE YOU BOUGHT
YOUR COPY OF
"PRECISION
HOLE LOCATION"?**

Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of \$3 in U. S. A.; \$3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.

Add a MOORE to YOUR TOOLROOM
JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS
DIE FLIPPERS • COMPLETE LINE OF HOLE LOCATION ACCESSORIES

NOW WITH THE NEW, MORE EFFICIENT
CINCINNATI Hypro Dual Saddle Control
and Precision Adjustment Handles

... It is possible to engage or dis-engage independently the feed or rapid traverse of any saddle or slide of either rail head from both ends of the rail from the head itself or from the opposite head. The slideably mounted precision adjustment handles provide accurate manual adjustment of tool point location of either head convenient to the operator's position at all times.



THE CINCINNATI HYPRO PLANER COMPANY

PLANERS · BORING MILLS · PLANER TYPE MILLERS

CINCINNATI, OHIO

deep slotting in magnesium

with
**BARBER
COLMAN**
Job-Engineered
CUTTERS

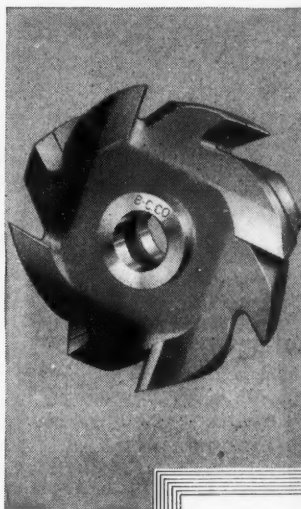
Deep slotting cuts in soft materials, when using conventional cutters, often result in chip congestion in the cutter, causing poor finish, and possible cutter breakage. Barber-Colman cutter engineers have designed a new style slotting cutter to take care of just such conditions.

On the job illustrated here . . . a typical example of this kind of milling . . . slots, 1.138" wide x 1" deep x 2" long, are rapidly milled from solid metal in magnesium brackets. Cutting time averages two pieces per minute. A patented Barber-Colman improved design interlocking side milling cutter which has coarse staggered teeth arranged with continuous cutting edges, is used to provide a free flow of chips.

When production calls for high speed milling of light metals, call on Barber-Colman Engineers for long-lived, efficient cutters, specially engineered for the job.

Barber-Colman Company

GENERAL OFFICES AND PLANT 172 LOOMIS ST., ROCKFORD, ILLINOIS, U.S.A.

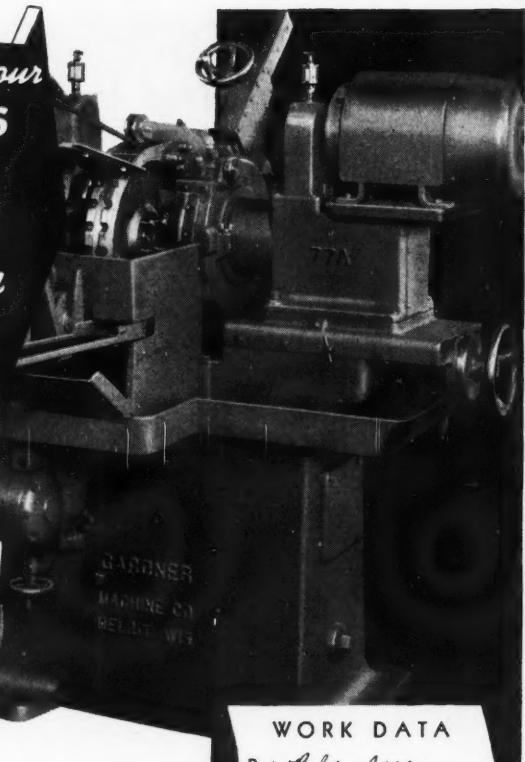
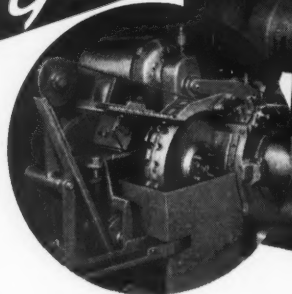


JOB FACTS

Material — Cast Magnesium, Soft
Operation — Mill slot, 1.138" wide x
1" deep x 2" long
Cutter — Patented B-C Interlocking Stag-
gered Tooth Side Mill, 6" x 1-3/16" x
1-1/4"
Feed — 24" per minute
Cutter Speed — 750 S.F.M., 480 R.P.M.
Floor-to-Floor Time — 1/2 minute
Tool Life — 300 pieces per sharpening



Maintain Your
PROFITS
by cutting
costs with
Gardner
DOUBLE
Grinding



Cutting costs, with GARDNER Double GRINDING is helping many manufacturers maintain profits — in spite of rising wages and increasing material prices. Reducing the time required to load and unload small parts, while holding work within essentially close tolerances, is one way GARDNER-GRINDING helps you avoid wasting manpower, or materials.

In the photographs above, relay cores are being gravity-fed in a continuous operation, between the opposed wheels of a Gardner No. 77A-12" Grinder that grinds TWO ends at ONE time, and unloads the parts automatically.

You can protect your profits with FAST, ACCURATE, low-cost, PRODUCTION, by GARDNER-GRINDING your flat surface work!

WORK DATA

Part *Relay Cores*
Material *Cold Drawn*
Magnet Iron
Operation *Grind Two Ends*
Tolerances: *.001 to .0015 for*
Uniformity
Stock Removal *.010" to .015"*
maximum overall
Production *25 to 30 pieces*
per minute
Feed *Hand Feed to Gravity*
Troughs Automatic
Unload
Machine *Gardner No. 77A-12"*
Double Grinder

GARDNER-GRIND
YOUR Flat SURFACES

Write for Latest Bulletin on Gardner DOUBLE Grinding!

GARDNER MACHINE COMPANY

428 East Gardner Street • • • Beloit, Wisconsin, U.S.A.

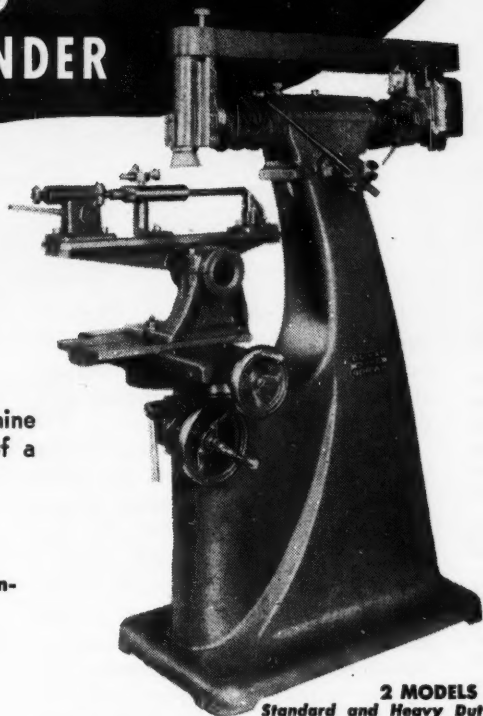
PRODUCTION GOES UP WITH CUTTERS SHARPENED ON THE ACE TOOL AND CUTTER GRINDER

The Oliver "ACE"
Cutter Grinder has
proven its worth in
tool rooms around
the world.

"Best cutter grinding machine
I've seen," is the remark of a
Plant Superintendent.

- It's easy to set up.
- Quick to index.
- Requires fewer fixtures.
- For high speed and Tungsten-Carbides.

SEND FOR CATALOG



2 MODELS
Standard and Heavy Duty

OLIVER INSTRUMENT CO.

1430 E. MAUMEE ST.
ADIAN, MICHIGAN

IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

OLIVER
OF ADIAN

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

Achievements in Precision!

CIRCLE R
TUNGSTEN CARBIDE TIPPED
CIRCULAR SAWS




Like the Palomar mirror, Circle R Tungsten Carbide Tipped Circular Saws had to conform to the highest standards and were not offered until this goal was reached.

Circle R Tungsten Carbide Tipped Circular Saws will uphold the prestige that peerless workmanship and continuously fine performance has earned for the nationally known Circle R trade mark. Specifications: 2½" to 10" in dia. 2½" to 4" as thin as 3-64. Special sizes on application. Furnished with both square and radius cutting edges. Tolerance plus or minus .00025.

At Booth 323 A.S.T.E. Industrial Exposition



Like the Palomar mirror, Circle R Tungsten Carbide Tipped Circular Saws had to conform to the highest standards and were not offered until this goal was reached.

Circle R Tungsten Carbide Tipped Circular Saws will uphold the prestige that peerless workmanship and continuously fine performance has earned for the nationally known Circle R trade mark. Specifications: 2½" to 10" in dia. 2½" to 4" as thin as 3-64. Special sizes on application. Furnished with both square and radius cutting edges. Tolerance plus or minus .00025.

At Booth 323 A.S.T.E. Industrial Exposition

Chicago • Philadelphia • New York • Dayton • Cleveland
Los Angeles • Rochester • Indianapolis • Detroit
St. Louis • Minneapolis

Leggett
WHEN YOU THINK OF
LATHES

No. 820
Quick Change
Gear Lathe

Adaptability

A black and white photograph of a large, heavy-duty industrial machine, likely a lathe or mill, with a complex structure and a large flywheel. The machine is mounted on a sturdy, dark-colored base. It features a large, curved flywheel on the right side, a central horizontal shaft, and various adjustment mechanisms and clamps. The overall design is functional and robust, typical of early 20th-century industrial equipment.

● The Logan Lathe's reputation for adaptability has been earned in many industries, in exacting tool room work, and on a variety of production operations. The Logan ball bearing spindle, for example, has a speed range of 30 to 1450 rpm. High speed carbide cutting tools can be used to full advantage, yet the lathe is equally adaptable to slow speed work. The wider range of Logan spindle speeds assures the most effective rpm for light or heavy cuts, as well as for machining widely different materials such as steels, cast iron, non-ferrous metals, and plastics. Rugged, precise construction throughout, plus Logan advanced design features assure lasting accuracy. A complete line of lathe accessories and attachments further increases the adaptability of Logan Lathes. Write for full information.

SPECIFICATIONS COMMON TO ALL LOGAN LATHES... swing over bed, 10½"... bed length, 43⅞"... size of hole through spindle, 23⁄64"... spindle nose diameter and threads per inch, 1½"—8... 12 spindle speeds, 30 to 1450 rpm... motor, ½ hp, 1750 rpm... ball bearing spindle mounting... drum type reversing motor switch and cord... precision-ground ways, 2 V-ways and 2 flat ways.

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LOGAN ENGINEERING CO., CHICAGO 30, ILLINOIS

Thorough-Bred FILES that come from BEST STOCK



No matter how carefully any tool may be processed, its life is predetermined by the quality of metal from which it is made. "American Swiss" selects only the finest quality file steel—not ordinary tool steel—for its Swiss-Pattern Files, to assure its products the "right start in life" . . . and to assure their users

the longest possible service.

Here you see a small part of the fine file steel stock of which "American Swiss" Files are made—one of the many reasons why users report that these precision tools last 25% to 50% longer than most Swiss-Pattern Files.

Buy From Our Local Distributor

AMERICAN SWISS FILE & TOOL CO., Elizabeth 1, N. J.

ASK FOR THEM BY NAME
American Swiss ★✚★

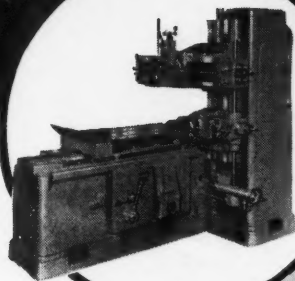
SWISS PATTERN FILES

Complete REDESIGN

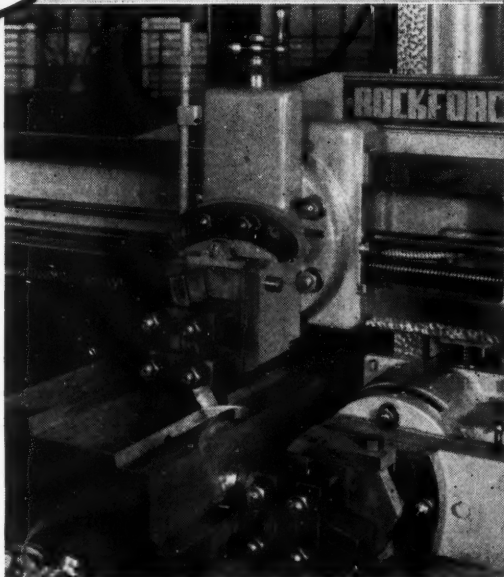
for

- increased range of application
- easier set-up and operation . . .

The redesigned Rockford Hy-Draulic 36" Openside Shaper offers two important new advantages: (1) Range of application is greater due to the new heavier Column and Rail, and the new redesigned Side Head . . . and (2) Ease of set-up and operation is improved because of such features as dual controls for table operation from either side of table. As extra equipment power rail elevation is available to further simplify set-up work. All the other advantages typical of any Rockford Hy-Draulic machine are provided by the new 36" Openside Shaper . . . such as fast cutting and return strokes with infinite speed selection between wide range low and high.



THE NEW
ROCKFORD
Hy-Draulic
36" OPENSIDE
SHAPER



Let a Rockford Hy-Draulic sales engineer give you the point-for-point story of the new Rockford Hy-Draulic 36" Openside Shaper advantages. See for yourself . . . or write for Bulletin 4441.

ROCKFORD MACHINE TOOL CO.
ROCKFORD ILLINOIS

SHAPERS

PLANERS

SLOTTERS

SHAPER-PLANERS

Hy-Draulic



Do You Need **A PORTABLE VISE!**

**WHAT SIZE ?
FOR WHAT JOB ?**

HERE

**... is a range
of models with
throat capacities
up to 6"—and
depth to 2½"**

... designed for holding work while welding, drilling, or for use as a part of permanent fixtures. Very handy. Spindle pre-set for desired thickness. Normal hand pressure locks jaws with unyielding bull-dog grip. All sturdy tools, made of steel forgings, cadmium plated ... Send for catalog.

LAPEER MANUFACTURING Co.

General Sales Office: 2906 W. Grand Boulevard • Detroit 2, Michigan
Manufacturers of the famous Knu-Vise Products, Lapeer, Mich.



GRINDS WELDS AT HALF THE COST

THIS manufacturer of road construction equipment was using a 3700 R.P.M. universal electric 6" grinder to grind welds flush for mounting parts. "Why so slow?" inquired the Rotor Application Engineer. They had air supply so he recommended a 6000 R.P.M. Rotor Air 6" grinder. Results:

Doubles output due to higher speed of Rotor grinder. Cuts grinding cost in half.

Improves working conditions because Rotor grinder weighs 7 lbs. less than former electric grinder . . . is easier to handle. New tool keeps cool . . . cuts operator fatigue.

Find out about similar possibilities for *your* production!

AIR O'TOOL

AIR

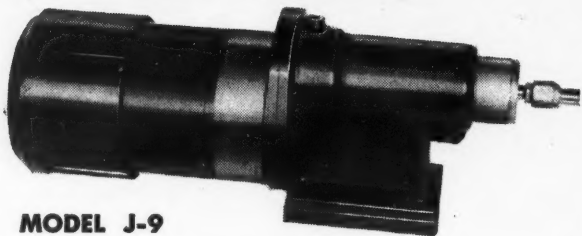
THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

HIGH
CYCLE

NEW!

GOVRO-NELSON UNIT



MODEL J-9

1. Spindle speed—9000 RPM.
2. Equipped with 3-phase, 60-cycle induction motor.
3. Three-point, ball-bearing suspension for smooth operation.
4. Mechanism runs in oil bath.
5. Built-in rate of feed control for reaming purposes.
6. Dwell at end of stroke.
7. Completely automatic with remote electrical controls.
8. Integral foot for accurate alignment.
9. Machined Diameter at nose for Special adaptations.
10. Can be operated continuously at 35 operations per minute.

WRITE FOR
Literature

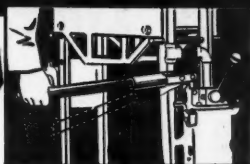
GOVRO-NELSON CO.

*Machinists of Precision Parts
for 25 Years*

1933 Antoinette
Detroit 8, Mich.

Automatic **DRILLING UNIT**

These **KRW** Hydraulic Arbor Press Features...



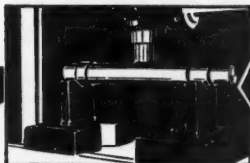
Fast Action, cylinder is filled as ram travels to work. You get tons of pressure with first pump stroke.



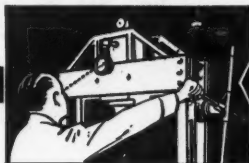
Finger Tip Control opens and closes valve in a jiffy. No gripping effort assures easier, faster operation.



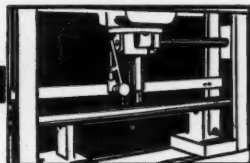
KRW Built-in Mechanical Press permits up to 3 tons pressure for straightening small diameter work.



One Piece, All Steel V-Blocks have machined surfaces for greater accuracy; usable upright or inverted.

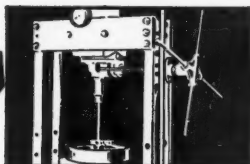


Highly Visible Pressure Gauges are mounted where they can be quickly checked. Read in tons and pounds.

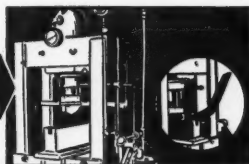


Micrometer Dial Attachment permits great accuracy in checking work without removing from V-block.

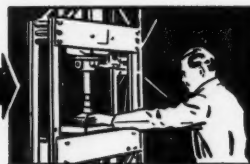
Reduce Costs ON THESE AND OTHER DAILY Production Jobs...



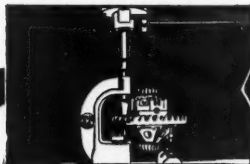
Broaching a key way in a flywheel. 7½ inch ram travel makes many broaching jobs practical on KRW Presses.



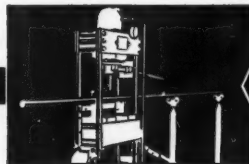
Bending in production lots with simple, inexpensive dies is easily done on low-cost KRW Hand-operated Presses.



Pressing of all types is efficiently handled. Adjustable bed makes pressing on long shafts a very simple operation.



Riveting with KRW Riveting Attachment is simplicity itself. Many KRW Presses are used for this type work.



Straightening, especially on long work, is easy on a KRW Press because of its special open-end construction.



Blanking is easy with simple die set for short-run operations. Releases regular equipment for quantity production.

Write for the
**NEW
KRW
Catalog.....**



K. R. WILSON, 215-217 Main St., Buffalo 3, N. Y.

Please mail me a copy of your
Hydraulic Arbor Press Catalog

16

Name

Address

K·R·WILSON

215 MAIN STREET, BUFFALO 3, N. Y.

For { **TOOL ROOM**
or **PRODUCTION LINE**



Write for 12 page
descriptive catalog.
Ask for bulletin 1054-
E6

SENTRY ELECTRIC FURNACES

Sentry High Speed Steel Hardening Furnaces are flexible, quick to heat to operating temperature and noted for their reliability and operating economy. They are equally adaptable to the production line and to tool room use.

Sentry Furnaces provide a correct application of the Sentry Diamond Block Method—a scientific control for maintaining a neutral atmosphere. They are clean—no fumes—no wasted fuel. Work is scale-free, with no decarburization—no reduction in size. One operator can tend several furnaces.

There's a Sentry Furnace to meet your particular requirements.

The Sentry Company

FOXBORO, MASS., U. S. A.



**ELECTRIC FURNACES BY SENTRY: HIGH SPEED STEEL FURNACES
MEDIUM & HIGH TEMP. INDUSTRIAL • CRUCIBLE • POT • HIGH TEMP. TUBE**

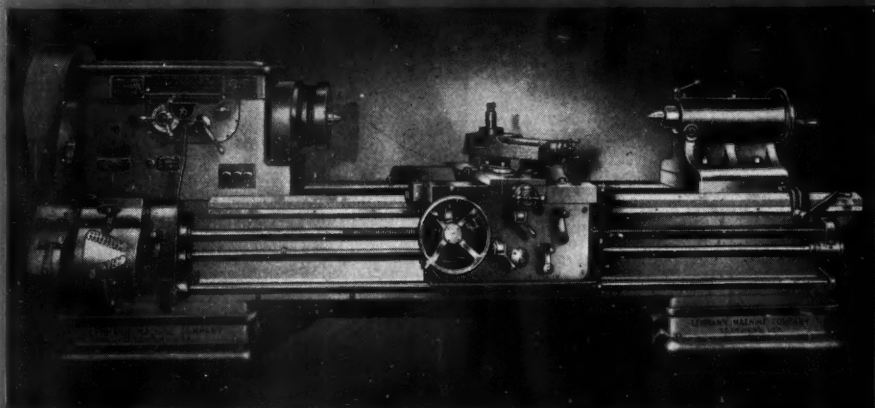


*These 3 Typical Users**

DO IT BETTER on

HYDRATROL LATHES

HEAVY DUTY TYPE



*** (FROM LETTERS IN OUR FILES • NAMES ON REQUEST)**



1. "HYDRATROL Lathes have been very satisfactory over a very intensive 3-shift operation for a long time. They have saved us many man hours."

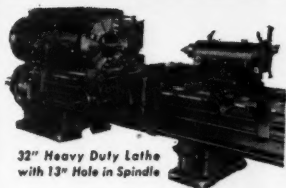


2. "For quite a few years we have had a large number of HYDRATROL Lathes in our shops here. The men working on these machines appreciate the ease of speed control afforded."



3. "HYDRATROL Lathes have been entirely satisfactory for turning high-strength forgings in record time."

Let us show you what a HYDRATROL Lathe could do in your shop. The 30" Standard Type, Heavy Duty lathe shown above, has all the ruggedness and power for the heaviest possible work. Send us prints for a specific recommendation.



32" Heavy Duty Lathe
with 13" Hole in Spindle

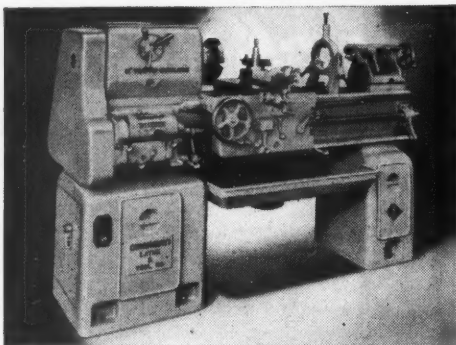
LARGE HOLLOW SPINDLE TYPE

4 SIZES—18" to 36"

Small . . . 18" up to 7 1/8" Hole
Medium . . . 25" up to 12 1/8" Hole
Large . . . 32" up to 16 1/8" Hole
Large . . . 36" up to 16 1/8" Hole
(Standard type lathes, 16" to 36")

L *ehmann* **MACHINE COMPANY**

CHOUTEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

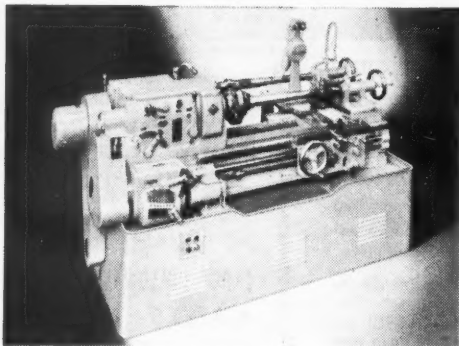
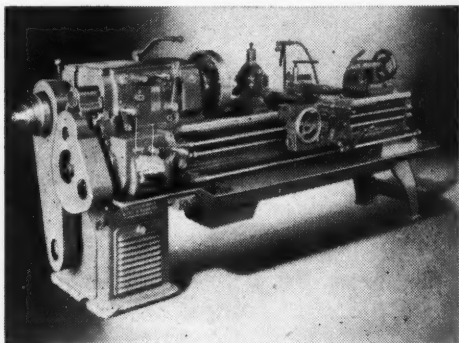


◀ exceptional features at lowest cost

NEW TRAY TOP CINTILATHE, a light duty, low cost motor driven geared head engine lathe, offers features not usually included in lathes of their size and price range. Built in 10", 12½", 15", and 18" swing sizes, and distances between centers from 18" to 60", 12 spindle speeds, with an overall ratio of 41 to 1, 48 thread and feed changes . . . Standard Motor Drive 10"—1 HP., 12½"—1½ HP., 15"—2 HP., 18"—3 HP . . . Tray Top Cintilathes in 15" and 18" sizes available with gap, including gap block.

capacity for practically all your lathe work ▶

STANDARD CINTILATHES in six nominal swings 14" to 24", bed lengths providing distances between centers from 32" to 238", 12 spindle speeds—32 changes of threads and feeds. These medium duty low cost lathes handle a wide variety of turning, boring, and threading operations for long or short runs. They offer capacity for practically all of your lathe work with a minimum investment. All sizes may be furnished with gap, including gap block.



◀ two machines in one, with feather-touch tracer control

NEW CONTOURMATIC CINTILATHE with feather-touch tracer control, turns multiple diameter shafts in small or medium production lots, automatically, accurately, and economically, and retains the full versatility of a standard engine lathe . . . Two machines in one, "Mike" once and all dimensions come true. Sensitive all hydraulic tracer control provides automatic duplication of master shape with high degree of accuracy. A profit maker for general machine shops, small manufacturing plants, and maintenance and repair departments. Supplied in same sizes as standard Cintilathes.

NEW TRACERMATIC CINTILATHE is a special machine for use primarily on molds, dies, etc. Work need not be circular in cross section.

Write for latest catalogs and prices.

CINCINNATI LATHE & TOOL CO.

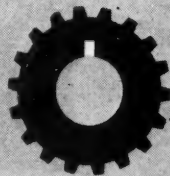
Oakley, Cincinnati 9, Ohio. Cable Address: Cintilathe



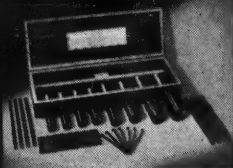
**TIME IS
MONEY ...
BIG
MONEY
TODAY**



**How long
does it
take you
to cut a
keyway
like this?**



**With This Minute
Man Keyway
Broach Kit you can
cut any keyway by
hand in one minute in
Gears, Pulley Hubs,
Couplings, Collars,
Milling Cutters, etc.**



**Pays For Itself In
No Time.** Cut a few
keyways and this Set
and a handy duMont
Arbor Press owes you
nothing at all.

**Ask Your Mill
Supply Distributor
to show you the
complete range of
Minute Man Kits.**

**MAIL THIS
COUPON**

Get the whole story
on what this Kit does,
how it works, how
little it costs.

The du MONT CORPORATION, Greenfield, Mass.
Please send me Descriptive Folder and Price List "S."

COMPANY

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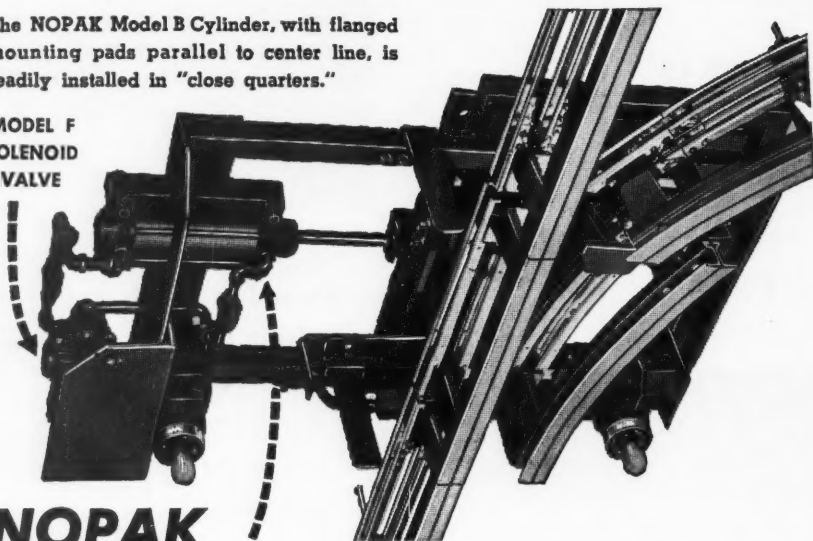
CITY

NAME & TITLE

The du MONT CORPORATION
GREENFIELD, MASSACHUSETTS

The NOPAK Model B Cylinder, with flanged mounting pads parallel to center line, is readily installed in "close quarters."

MODEL F
SOLENOID
VALVE



NOPAK Cylinder *"Throws the Switch"* in **AMERICAN MONORAIL SYSTEMS**

These overhead systems are noted for fine engineering, sturdy construction, smooth operation. The NOPAK Model "B" Air Cylinder throws the switch which permits the Monorail carrier to go from the main rail to either of two spurs. Self-regulating cushion action assures fast positioning of rail segments without jarring switch frame. Cylinder is actuated by a NOPAK $\frac{3}{8}$ " Model "F" Solenoid Valve.

American Monorail's satisfaction is expressed as follows: — "This cylinder, because of its compactness, mounts very nicely in the switch frame, and has more than sufficient power to *throw the switch* with its precision stroke." You, too, will find NOPAK Valves and Cylinders adequately suited to your design and operating needs.

GALLAND-HENNING MFG. CO., 2758 S. 31st Street, Milwaukee 7, Wis.

Write for Illustrated
Bulletin No. 92

Representatives
in Principal Cities

NOPAK

VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

Speed Production Cutting with this NEW

Radial SKIL Saw

New Type Arm...Faster Set-ups...Greater Accuracy

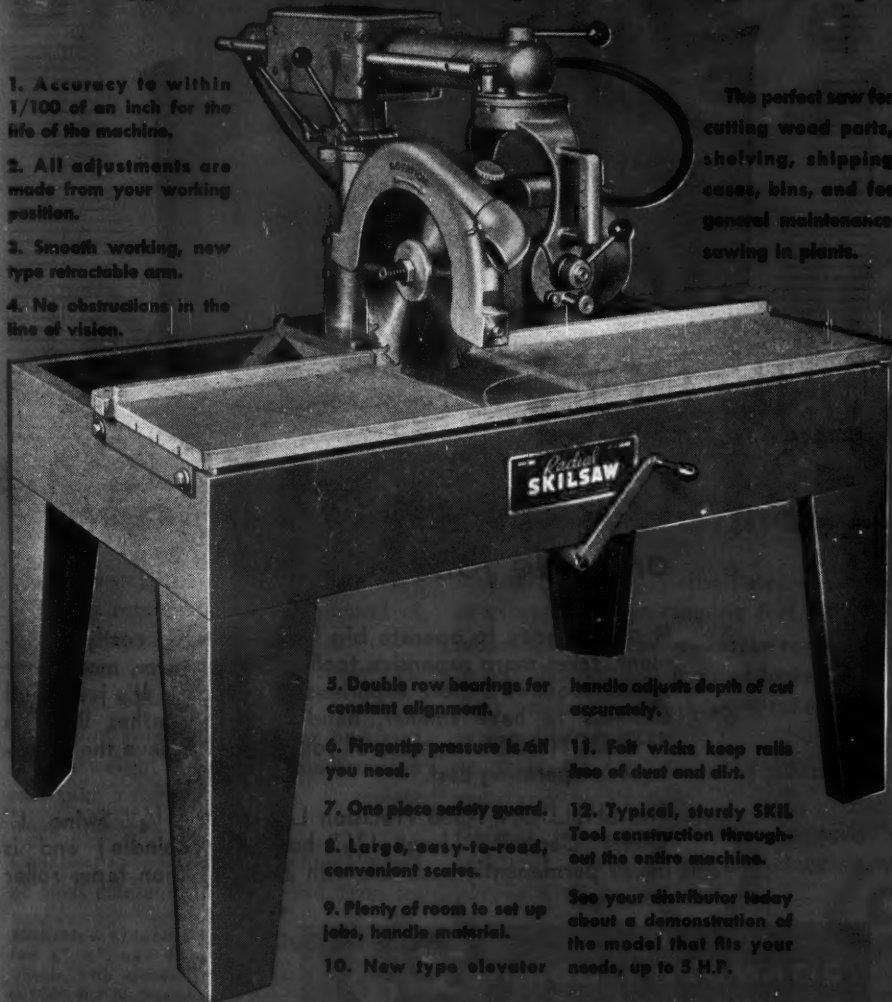
1. Accuracy to within 1/100 of an inch for the life of the machine.

2. All adjustments are made from your working position.

3. Smooth working, new type retractable arm.

4. No obstructions in the line of vision.

The perfect saw for cutting wood parts, shelving, shipping cases, bins, and for general maintenance sawing in plants.



5. Double row bearings for constant alignment.

handle adjusts depth of cut accurately.

6. Fingertip pressure is all you need.

11. Felt wicks keep rails free of dust and dirt.

7. One piece safety guard.

12. Typical, sturdy SKIL Tool construction throughout the entire machine.

8. Large, easy-to-read, convenient scales.

9. Plenty of room to set up jobs, handle material.

See your distributor today about a demonstration of the model that fits your needs, up to 5 H.P.

10. New type elevator

SKILSAW, INC.

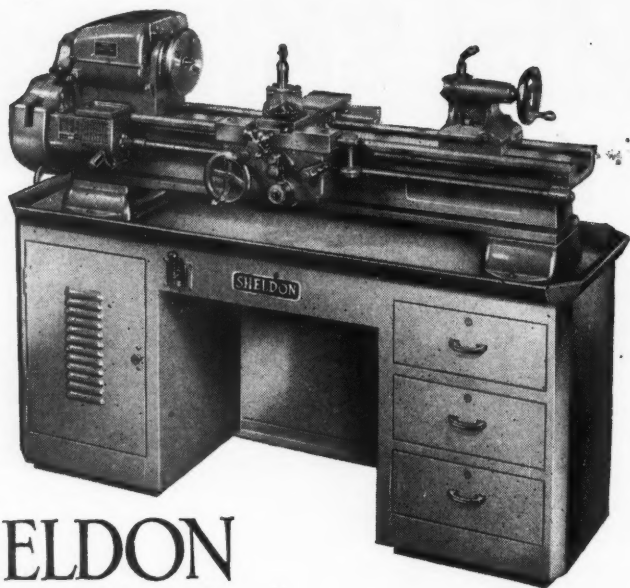
3023 Elston Ave., Chicago 30, Ill.

In Canada SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.

SKIL Saw is made only by SKILSAW, INC.

SKILTOOLS





SHELDON

T-S56 PRECISION LATHES

*Why wear out big equipment
on little jobs . . .*

It costs money to operate big lathes—ties up costly equipment, takes more expensive tooling, more power, more floor space, requires a more experienced operator. It's just good business to have smaller, handier, faster, lathes like the SHELDON T-S56 for much of your work, and save the difference in operating cost.

The SHELDON T-S56 Precision Lathe has 11 $\frac{1}{4}$ " Swing, 1" Collet Capacity (large 1 $\frac{3}{8}$ " hole thru spindle) and is made permanently accurate with Zero Precision taper roller bearings.

Write for Bulletin

SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4250 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.



Cut YOUR GRINDING COSTS

with new CP Pneumatic Grinders

New heavy duty CP Pneumatic Grinders remove maximum amount of metal in any given time . . . with low maintenance . . . because of these outstanding features:

Steel clad spindle and motor housings — lightweight steel tube construction can take rough handling . . . resists wear and tear.

Constant speed governor — holds wheel at most efficient cutting speed, from no

load to full load . . . eliminates danger of overspeed when running free.

Movable exhaust ports — can be revolved to any desired position and locked.

Easy action throttle valve — takes the jerk out of starting.

Multiple disc air cleaner — offers no resistance to air flow.

Built-in lubricator — large capacity reservoir . . . trouble-free, non-clogging, porous wick system.

Available in wide range of models for 4", 6", and 8" diameter wheels, with speeds from 2000 to 9000 R.P.M. Straight or pistol grip handles; 20" and 35" extensions; wire brush attachments, etc. Write for Bulletin SP-2068.



**CHICAGO PNEUMATIC
TOOL COMPANY**

8 East 44th Street, New York 17, N. Y.

Pneumatic Tools • Air Compressors • Electric Tools • Diesel Engines • Rock Drills • Hydraulic Tools • Vacuum Pumps • Aviation Accessories



Accurately Size and Finish
Holes in Dies—Jigs—Gauges—
**FASTER, EASIER,
AT LOWER COST**

with the
**SUNNEN PRECISION
HONING MACHINE**

Typical Jobs



Drawing and blanking die "saves time in producing smooth base metal finish."



Sunnen precision honing to a highly polished finish increases wearing quality of these hardened steel drill jig bushings.



Rubber Eraser Extrusion Die "Triples life of extrusion dies."



Hardened steel ring gauge—finished to an accuracy of .000025" for roundness and straightness.

You can add extra hours of life to your tools and dies by precision honing all holes from .120" to 2.625". Sunnen Precision Honing is the ideal method to fit dowel pins and ejector pins—to produce smooth, accurate drill jig bushings—and to add extra service life to extrusion dies.

In hardened steel, the Sunnen Precision Honing Machine hones holes that are accurate to .000025", and it produces a surface finish as low as 2 micro inches. Hones perfectly straight round holes, free from bell-mouth and taper. Change over from one size to another can be made in one minute.

Range of mandrels from 120" to 2.625" is complete. There are no missing sizes. New Sunnen Tool Room Mandrel Sets provide a convenient method of storing and selecting the proper size.

For complete information on the Sunnen method of honing for greater accuracy in tool room work write today—or call in a Sunnen Engineer.



SUNNEN PRODUCTS COMPANY

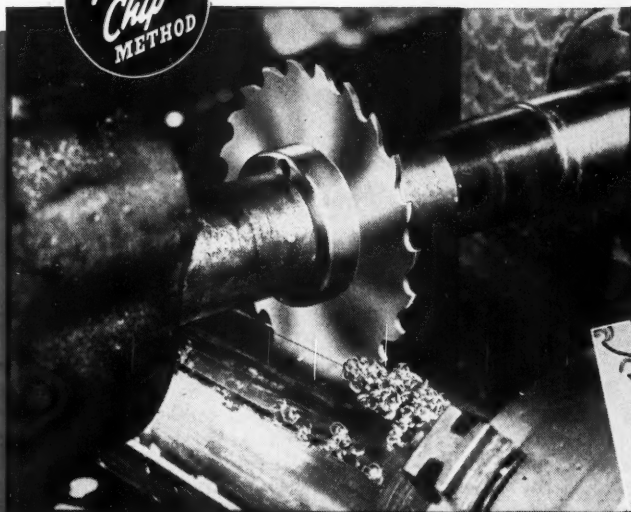
7933 Manchester Ave.

St. Louis 17, Missouri

Canadian Factory: Chatham, Ontario

BREAK UP *Your Chip Loads.*

CASH IN ON FASTER FEEDS AND SPEEDS!



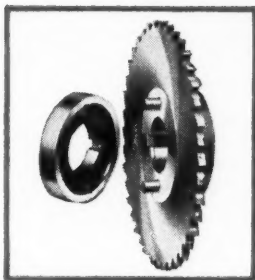
The M. & M. "Hi-Lo" principle provides alternate high and low teeth which form single wide and double narrow chips, respectively, dividing the load.

"HI-LO"
PRINCIPLE
RESULT—
TRIPLE
CHIP



MOTCH & MERRYWEATHER *Slitting Saws*

GIVE GREATER SPEEDS AND LONGER TOOL LIFE

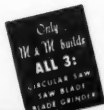


Motch & Merryweather's original dual drive equalizes stresses, gives plenty of driving power, and makes blade keyways unnecessary.

M. & M. Slitting Saw Blades enable you to profit from record-breaking speeds and satisfying accuracy. They give you all the well known advantages of the Triple-Chip Method. The characteristic M. & M. curved, cam-generated tooth contour avoids clogging, since the curling chips are self-clearing. A generous gullet imparts great strength to the teeth. Result: faster cutting, longer blade service.

Exclusive dual drive design supplies positive driving power and protects the driving means; practically no blade breakage. Blades adaptable to arbors up to 1 1/4"; interchangeability conserves blade investment. Range of pitch in all diameters and thicknesses. Other big advantages, too.

Get well illustrated Bulletin "D"



THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING

CLEVELAND 13, OHIO



*Special
Announcement*

BY

Tabor



NEW

Abrasive Cutoff Machines!

● Tabor—pioneers in designing and building abrasive cutoff machines for the foundry industry—now brings to metal-working people a *new* series of cutoffs for bar stock and shapes. And the whole line is tough, precise and "production-minded" 'cause that's the way Tabor always builds cutoff machines.

Every feature is designed to give high speed cuts, low wheel cost and excellent cut surface characteristics with least possible loss of metal. Specially constructed, Timkin Bearing-mounted spindle assures cool running and reduces end-play adjustment to an all-time low.

It'll pay you to get full details on these rugged new-comers. We've prepared a brand new bulletin. It's yours for the asking—so write today!

The **TABOR** *Manufacturing Co.*

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

They're cut out . . .

SPECIFICATIONS

MOTOR—10 H.P., fully enclosed and fan cooled

COOLANT EQUIPMENT—Centrifugal pump driven by $\frac{1}{4}$ H.P. motor

POWER TRANSMISSION—Multiple V-belt drive

WHEEL SIZE—Takes wheels up to 16" diameter

WHEEL SPEED—10,000 feet per minute

CAPACITY—2½" round, square or

hex.; 3" x $\frac{3}{4}$ " angles; 4½" O.D. tubing; $\frac{3}{4}$ " x 3" flats

CONTROLS—Automatic starter with overload and no-voltage release.

Wheel and coolant system push-button controlled

WEIGHT OF MACHINE—1800 lbs.

ACCESSORY EQUIPMENT—Price includes 12 wheels, gloves, goggles, apron and wrenches



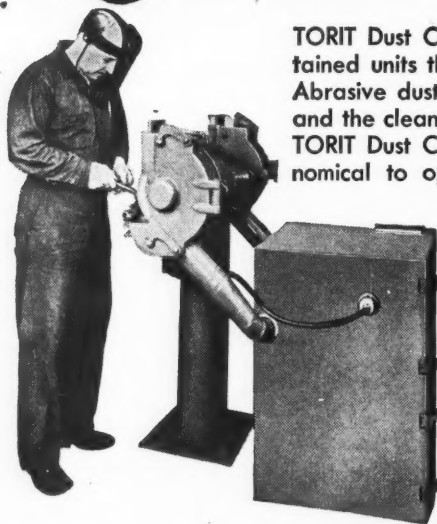
**Tabor-Brasive Cutoff Machine
TYPE D10FWP**

... TO CUTOFF !



Abrasive dusts irritate workmen and slow production. Eliminate them with

TORIT DUST COLLECTORS



TORIT Dust Collectors are completely self-contained units that are attached at the machine. Abrasive dusts pass through spark-proof filters and the cleaned air is recirculated.

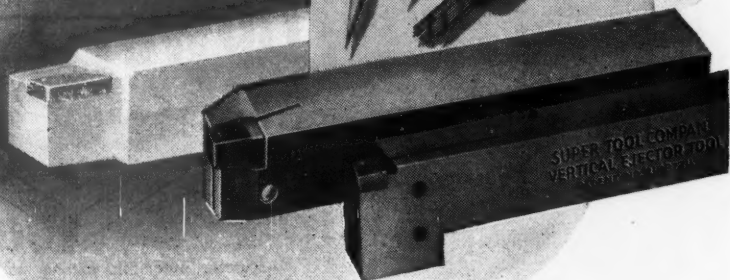
TORIT Dust Collectors are easy to install, economical to operate, and may be moved as production layouts are changed. Sizes ranging from $\frac{1}{3}$ HP to 3 HP, and fitting all standard grinding, cut-off and polishing wheels are available for immediate delivery. For details and latest TORIT catalog write:

**TORIT
MANUFACTURING CO.**

296 WALNUT ST. • ST. PAUL 2, MINN.



*On Your Desk**
A LESSON IN
TOOL ECONOMY
& PERFORMANCE



HORIZONTAL TYPE



STRAIGHT



OFFSET

VERTICAL TYPE



SQUARE



ROUND



TRIANGULAR

SUPER EJECTOR* TYPE TOOLS

Consider these advantages of Super's Ejector type tool with inserted solid carbide bit compared with brazed or "point held" carbide: (1) Replace bit without replacing heat treated alloy steel holder. (2) Easy grinding in holder without bringing wheel in contact with steel permits economical use of diamond wheels. (3) Three times as many grinds to equal length of carbide. (4) Patented holding design eliminates stresses and strains on bit, permitting heavier cuts and less danger to carbide in rough and interrupted cuts.

Carbide inserts on vertical tools 1½" long.

Write for our Bulletin on these tools.

STANDARD AND SPECIAL

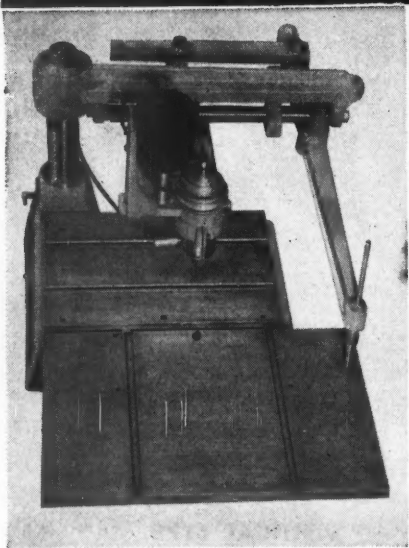
SUPER Carbide Tools

SUPER TOOL COMPANY

21650 Hoover Rd., Detroit 13, Michigan

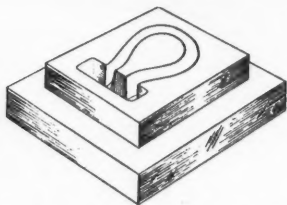
5210 San Fernando Rd., Glendale 3, California

Fast, Efficient, Economical Production of ...



MILLING - DRILLING - ENGRAVING BORING - PROFILING - ROUTING

The PHILBRO "CONTROL CUT" Model CC-3D is a 2 and 3-dimensional milling or engraving machine that will produce any required shape, line or contour from an enlarged master template. Note examples shown below.



Accurate, automatic milling and profiling is a simple production problem when done with the CC-3D.

Molds and dies easily and economically made by the Philbro "Control-Cut" Model CC-3D.

2 AND 3 DIMENSIONAL Model CC-3D

Control-Cut permits accurate profiling of parts, shapes or designs. All necessary boring or engraving easily accomplished.



Mass production obtained from one master template, without skilled operators.

Pantograph Controlled ENGRAVER Model PE-1.

Widely used for rapid commercial and industrial production engraving of all machinable metals, wood, plastics, ivory, etc. • Built of the finest material and precision made in all details. • Does not require skilled operator. • Easily regulates depth of cuts. • Engraves area 5 x 5 and larger by resetting work.

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Send for detailed information.



**Model
PE-1**

AUTO ENGRAVER COMPANY, Inc.

1776 BROADWAY

NEW YORK 19, N. Y.

Cut Screwdriving Time

**On Your
Assembly
Line**

Capacity:
1/4" Hex. Bit to
No. 10 Flat or
No. 12 Round
Head Screws.



with a *Mall*
REG. U.S. PAT. OFF.
SCREWDRIVER

A fast, accurate assembly tool—the Mall Screwdriver drives screws to uniform tightness at top speed. Its light weight (only 3 lbs. without cord), compact design, and convenient pistol type grip make for easy operation and reduce operator fatigue. Its adjustable single slip clutch can be set at a predetermined uniform tightness so that when the screw reaches this tension, the clutch automatically "slips"—eliminating stripped off screw threads and broken studs. It is ruggedly constructed with die cast aluminum housing, extra long brushes, hardened steel gears and self lubricating bearings. Available in two voltages—110-volt AC-DC or 220-volt AC-DC.

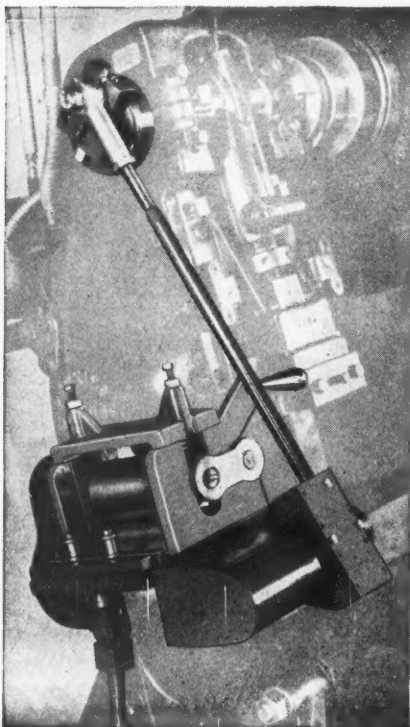
Ask your Supplier or write Power Tool Division for literature.

MALL TOOL COMPANY

7814 South Chicago Avenue

Chicago 19, Illinois

26 Years of "Better Tools For Better Work"



**IT'S HERE
IT'S NEW
IT'S ACCURATE**

WHYTE ROLL FEED

No other Feed gives you all of these **IMPROVED FEATURES:**

1. Carbide wear blocks for accurate roll clutch feed.
2. Hardened, ground and chrome plated feed rolls.
3. Simple two post mounting quickly adjustable to die height.
4. Capacity—Standard:
0 to $\frac{1}{4}$ inch stock thickness
0 to 6 inches stock width
0 to 16 inches length of feed
5. Types—Single, Dual, Left to right, Right to left, Front to back, Back to front.

This feed is well built for hard daily use, of simple design to eliminate all complicated parts and to insure rapid, smooth, and accurate feeds under all conditions.

SPECIAL FEEDS ON REQUEST.

**PROMPT DELIVERY,
MODERATE PRICES.**

WRITE TODAY FOR FACTS.

WHYTE ENGINEERING COMPANY

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SPRINGFIELD, MASS.

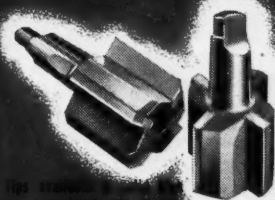
*Die Feeds . Dial Feeds . Slide Feeds
Pick-off Attachments . Stock Straighteners . Lamination Dies*

Style "1"
Long Series

Both styles in
sizes 1/8" to
3" in steps of
one-sixteenth

R-2643 (MFG)

Style "2"
Stub Series



Tips made of tough
speed steel or Stubite Tip
Tungsten Carbide-Tipped tip
made up special

TRIPLE SAVINGS

with SCULLY-JONES
**REMOVABLE TIP
CORE DRILLS**

YES, they save you money three ways—

- 1 **Holders outlast many tips;** tough core resists breakage; glass-like hardened finish withstands nicking and burring.
- 2 **You save set-up time;** Morse Taper shank is easy to insert in spindle of radial drills, drill presses, boring mills or special machines, and is quickly ejected with a drift key.
- 3 **You save "down time";** Stub Taper shank on tip permits easy insertion, ejection without removing holder from spindle.

Cored holes can be cleaned up more accurately as the four-fluted tips take cuts that may be uneven due to any shift in core. Positive Tang Driven, Rigid Holders with wide lands and tapered shanks assure a true running tool.

For complete information see pages 182-184 of Scully-Jones Tool Engineering Manual 500.

IMMEDIATE DELIVERY
on Scully-Jones Removable
Tip Core Drills for most
core drilling conditions

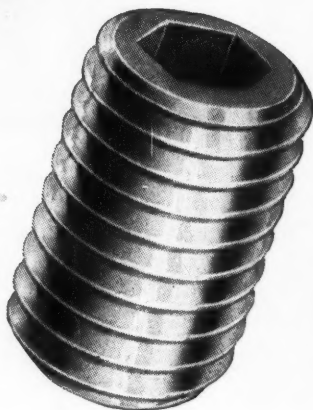
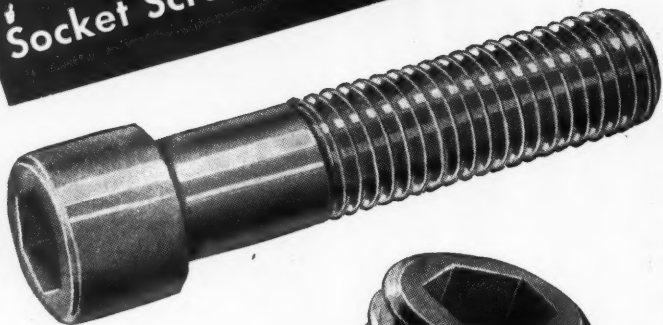


Scully-Jones
AND COMPANY

1809 S. ROCKWELL STREET
CHICAGO 5, ILLINOIS

(1) Style "A" Top Checks. (2) Style "B" Top and Drill Checks. (3) Adjustable Adapters. (4) Magic Quick Change Checks. (5) High Speed Machine Adapters. Spacing Collars. (6) Counterdrills. (7) Centers. (8) Reamer Tools. (9) Thread-Tap Work Rests. (10) ...

B-RIGHT-ON
Socket Screw Products



Special Low Head
Cover Plate Screw

DEALERS

Our large, complete, and centrally located stock is

AT YOUR SERVICE

Investigate this fast moving, profitable line.

The dependable B-Right-On Socket Screw Products Line includes Hollow Set Screws, Cap Screws, Hollow Pipe Plugs and Stripper Bolts. Production runs solicited.

Brighton

SOCKET SCREW PRODUCTS

THE BRIGHTON SCREW & MANUFACTURING COMPANY
Reading Road at Dorchester Cincinnati 2, Ohio

**BAY
STATE[®]**

BAYFLEX[®]

Time saver—

money maker—

easier—

faster!—

—write them today!



Foundry and metal-fabricating shop operators are overwhelmed with their increased piece work production from BAYFLEX RAISED HUB DISC WHEELS.

Yes, where heavy duty portable grinders and sanders are used the jobs can now be done much faster—easier—cleaner. No wonder that BAYFLEX is so popular with management and operators alike!

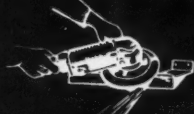
The merits of this new product are many . . . the production possibilities unlimited. To appreciate the full value of BAYFLEX however, you must see it in operation. Ask for a demonstration at your plant. No obligation.

Branch offices and warehouses —
Chicago — Detroit
Distributors — All Principal cities

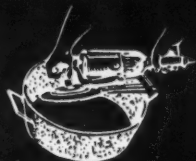
Top Performance Consider
BAY STATE ABRASIVE PRODUCTS CO.,



Unexcelled for cleaning castings.



For welds on angle iron frames.



For hard-to-get-at places.



Has no equal for smoothing welds.

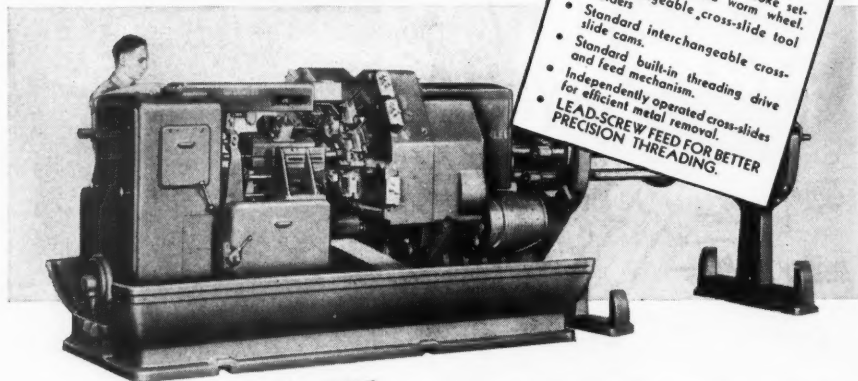


Hundreds of uses in auto repair shops.

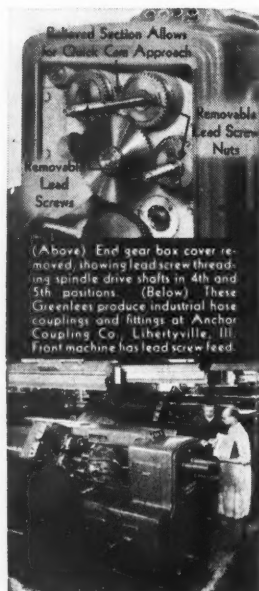


A "MUST" for metal-fabricating shops.

LEAD-SCREW FEED FOR *Better* PRECISION THREADING....



HAS BEEN ADDED TO THE OUTSTANDING FEATURES OF **GREENLEE "6"** **AUTOMATIC SCREW MACHINES**



Operators on Greenlees have plenty of elbow room to work in the tooling area, for changing tools, making adjustments, checking work during set-up, etc.

Change-overs are speeded by a quick and easy adjustment for the main tool-slide stroke. No cams to struggle with—just a simple setting to make on a graduated worm wheel.

Tool-holders for the cross-slides are interchangeable so any tool fits all cavities.

Feed-setting on cross slides is fast and simple, using standardized and interchangeable cams—any of which will fit any slide.

Cam-controlled threading feed is a *standard built-in feature* on Greenlees, including built-in drive sleeves in four positions.

Cross-slides are independently operated—permitting the set-up man to select from a wide variety of tooling arrangements and make adjustments as necessary.

AND NOW an extra feature to meet modern production demands—**LEAD SCREW FEED** for extra power and precision on threading operations. The mechanism can be added to most existing Greenlees at low cost.

FREE LITERATURE

Learn more about these and many other valuable Greenlee features that make this machine "The Operator's Favorite". Write today for bulletins—ask for Screw Machine Literature.



GREENLEE BROS. & CO., 1882 MASON AVE., ROCKFORD, ILLINOIS

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

VISIT BOOTH No. 302
The Tool Engineers'
Industrial Exposition



STANDARD

DuBo



The plug gage that is replacing cylindrical types

*Patents Pending

Only 1/5 as heavy as
equivalent cylindrical
plug gages

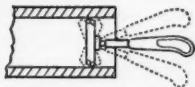
Readily entered — even
into undersize bores

Easily detects taper and
out-of-roundness

Checks ordinary bores
better and quicker than
cylindrical plugs

Does a variety of jobs
cylindrical plugs can't
do

LIGHTNESS in weight, ease of handling,
and definiteness of indication are giving DuBo
preference among machine operators, inspection
personnel and engineers.



Operates by tilting handle. Whether
handle will drop freely or not is the
definite, yes-or-no indication.

GAGING
SURFACE
(Spherical)

DOUBLE END
Size 1.510 (38mm.)
and smaller

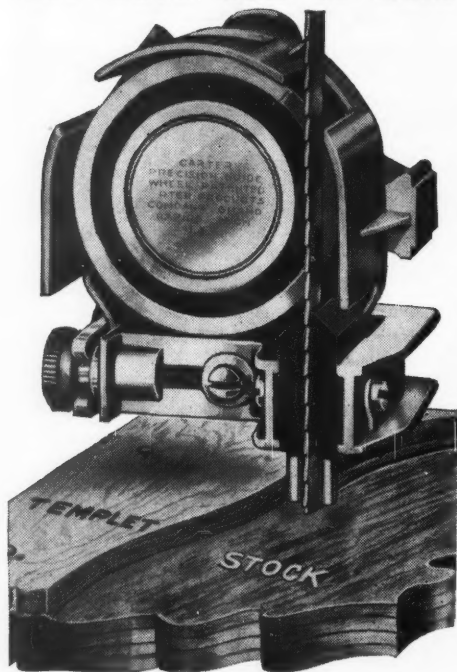
SINGLE END
Size 1.510 (38mm.)
and larger

WRITE FOR
BULLETIN

STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.

TEMPLET PINS Increase Value of CARTER *Micro-Precision* GUIDE

You Save Cost of Guide in 2 Weeks Sawing



**Carter Micro-Precision Guides
with Templet Pins
Carter Rigid Band Saw Wheels
Carter Quick Change Tires**

**C A R T E R
PRODUCTS COMPANY**

**959 Michigan Trust Building
Grand Rapids 2, Michigan**

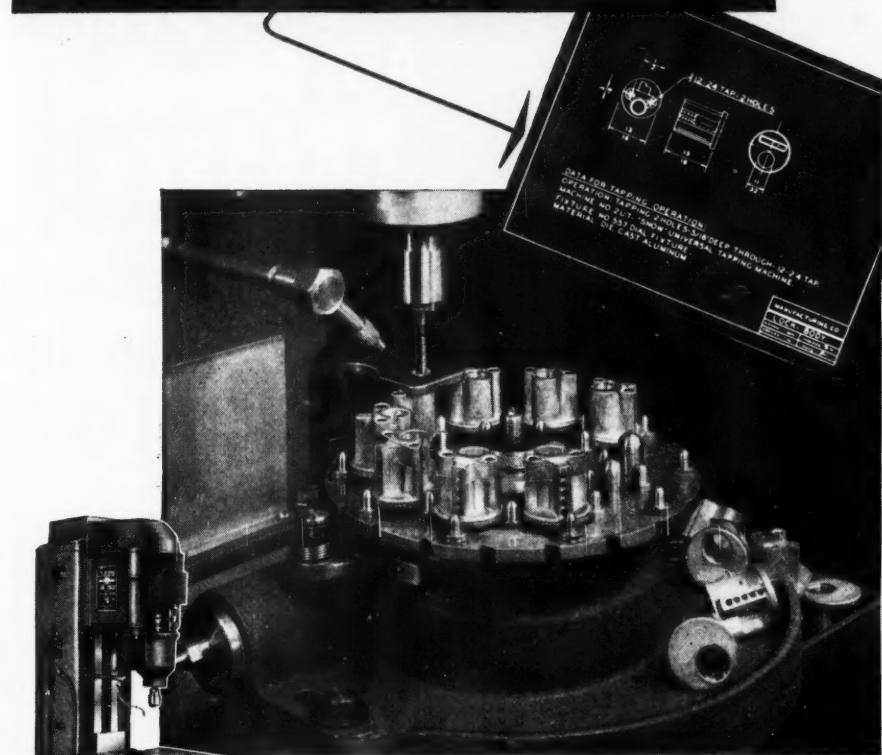
The addition of TEMPLET PINS to the CARTER Micro - Precision GUIDE enables your operator to saw more pieces per hour with increased accuracy, as costly and inaccurate marking of stock is eliminated. TEMPLET PINS permit sawing of normal band saw sweeps . . . You can save the cost of your CARTER GUIDE in from 10 days to 2 weeks sawing with the Templet Pin feature . . .

WRITE TODAY

You, like progressive Manufacturers across the continent, will be interested in the time and money saving features obtainable with CARTER Band Saw Equipment. We invite your requests for full details.

Band Saw WHEELS • TIRES • GUIDES • GUIDE LIGHTS

SNOW FULL UNIVERSAL TAPPING MACHINE



DATA FOR TAPPING OPERATION:
OPERATION TAPPING 2 HOLE 1/2" DEEP THROUGH 12" 2 1/2" TAP
MACHINE NO. 1017 "SNOW" UNIVERSAL TAPPING MACHINE
CAPACITY NO. 1017 "SNOW" UNIVERSAL TAPPING MACHINE
MATERIAL: DIE CAST ALUMINUM

MANUFACTURED BY
SNOW MANUFACTURING COMPANY
BELLWOOD, ILL.

The SNOW Full Universal Tapping Machine is complete with electric controls, motor driven lubricant pump, air operated table lift, and dirt and moisture trap.

All types of air operated indexing and clamping fixtures and jigs can be instantly synchronized with the cycle of the machine. The electric controls provide various types of operation to suit any specific tapping problem. Extreme sensitivity in the application of power eliminates tap breakage, and allows class 3 and 4 fits to be obtained at no loss in production.

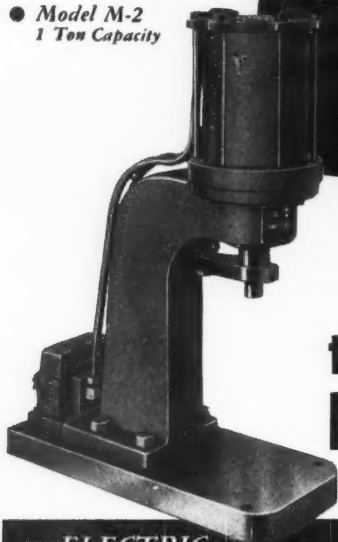
Years of experience and thousands of installations enable us to assist you in any of your tapping requirements. Submit blue prints and sample parts for specific recommendations, production estimates, and tooling data.

SNOW MANUFACTURING COMPANY

443 EASTERN AVE., BELLWOOD, ILL. • SUBURB OF CHICAGO



- *Model M-1*
1 1/2 Ton Capacity
- *Model M-2*
1 Ton Capacity



NEW High Speed Air Operated PRESSES

Designed and Built
to help you **SPEED UP**
PRODUCTION

ELECTRIC

PUSH BUTTON CONTROL

HERE'S help for manufacturers who want to speed up production on light stamping, press fit assembling, marking, die cutting, and similar operations. Take advantage of the opportunities offered by Hannifin's new high speed, air operated presses!

TWO MODELS: Model M-1 has 6" gap, develops 1270 lbs. ram pressure with 80 lbs. air. Model M-2 has 12 1/4" gap and 2650 lbs. capacity. Both moderately priced.

FAST OPERATION. Made possible by push button control through new electric solenoid valve. Stroke adjustable to work requirements. Every operating convenience.

QUALITY CONSTRUCTION. Built to big press standards for quality. Cylinder "TRU-BORED" and honed to satin finish. Working parts precision machined and finished. For information, see your local Hannifin representative or write for new bulletin NP-1007-I.

HANNIFIN

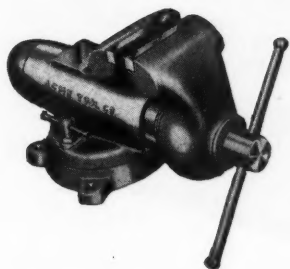
*Nationwide
Sales and
Service*

HANNIFIN CORPORATION

1101 So. Kilbourn Ave., Chicago 24, Ill.

AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES

Superior Holding Power with ACME VISES



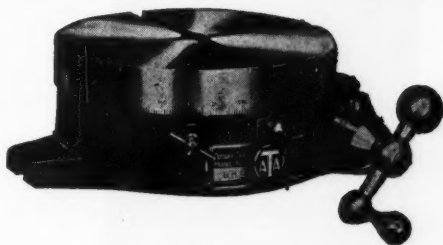
Acme Vises have all the essential features that will rigidly hold your work in the vise.

- Furnished with Swivel Base
- Accurately Fitted Spindle
- Unbreakable Sleeve Nut
- Even, Central Pull
- Interchangeable Jaws
- Made in 11 Sizes from 2" to 6".



Reduce Expensive Fixture Costs

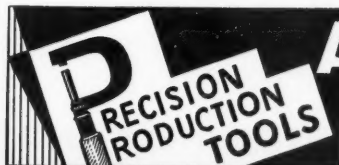
UNIVERSAL ROTARY TABLES often take the place of costly fixtures. Greatly reduces set-up time on many of your Milling Machines, Drill Presses and Horizontal Boring Mill Operations. Made in 7 sizes.



Dividing attachments are available to fit all Rotary Tables, except the 9" size. One attachment is interchangeable on 3 sizes of Rotary Tables.

Write for Literature

Prompt Delivery



ACME TOOL COMPANY

69 WEST BROADWAY

NEW YORK 7, N. Y.

DEVELOPED TO SAVE YOU MONEY



THE NEW NO. 5 CUTTER AND TOOL GRINDING MACHINE

UNIQUE FEATURES

- ✓ Double-ended ball bearing wheel spindle (super-precision, permanently-sealed, grease-lubricated bearings).
- ✓ Ingenious roller-bearing table
- ✓ 4-location table crank or knob
- ✓ Hollow, one-piece base, mounted on 3 points to preserve alignment
- ✓ Money-saving attachments

Centers swing $6\frac{3}{8}$ " in diameter. Maximum longitudinal table travel, 6". Distance center line of work to center of wheel spindle, greatest $8\frac{1}{8}$ ", least, $1\frac{3}{8}$ ". Distance, center of wheel spindle to top of table, greatest, $6\frac{7}{8}$ ", least $1\frac{3}{8}$ ". Write for specifications, Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BROWN &

ON CUTTER AND TOOL GRINDING

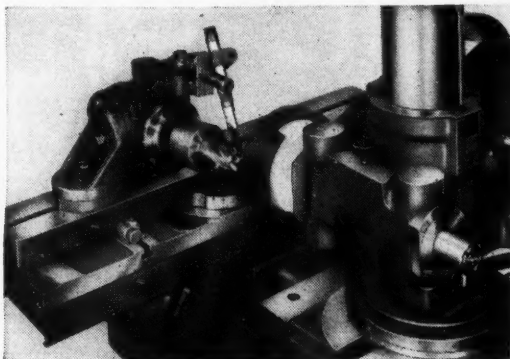
NEW OPPORTUNITIES

Unusually flexible and handy in size, the new No. 5 Cutter and Tool Grinding Machine simplifies and speeds up cutter and tool

sharpening. It is specifically designed to improve tool room efficiency in sharpening all types of small cutters, especially end mills.

✓ SAVE ON SET-UPS AND OPERATION

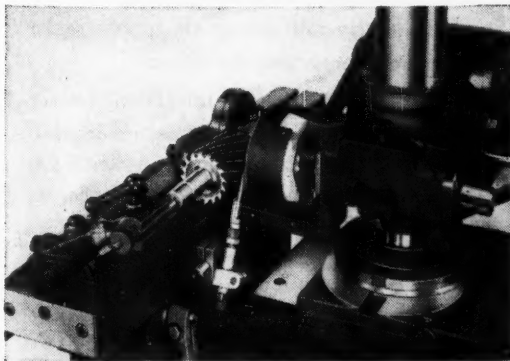
The super-sensitive operation of this machine makes set-ups and operation exceptionally fast and easy. It is the result of an ingeniously-designed table which slides on precision-ground rolls . . . plus lighter weight parts, engineered for fast and accurate sharpening.



Sharpening End Teeth of Spiral End Mill

✓ SAVE ON FLOOR SPACE AND INVESTMENT

For a moderate investment, the No. 5 Machine will do much of the work that has been done frequently on larger, more expensive machines. On the basis of smaller overhead and space alone, it will reduce the unit cost of sharpening many cutters and tools.



Sharpening Plain Milling Cutter

SHARPF

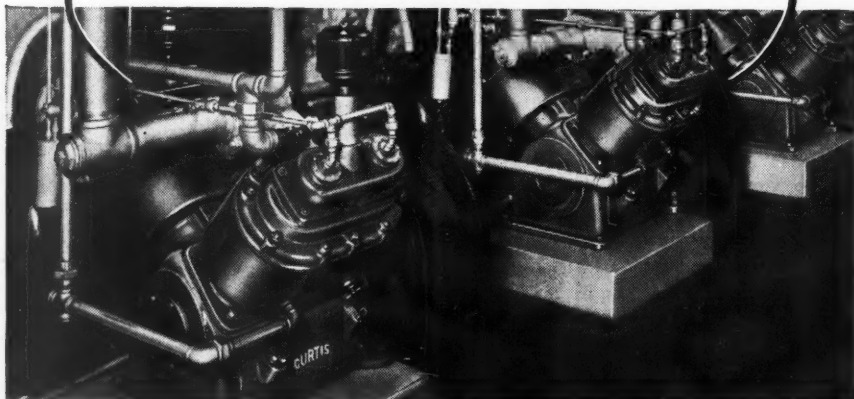
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FOR AN ADEQUATE, DEPENDABLE AIR SUPPLY

Specify **CURTIS**

"PRECISION BUILT"

AIR COMPRESSORS



In thousands of plants throughout the country Curtis Model "C" Air Compressors are delivering a completely satisfactory air supply under widely varying conditions.

The precision construction of every Curtis Air Compressor assures dependable, trouble-free operation with less wear, unusually long life and low oper-

ating and maintenance costs. Curtis economy results from such outstanding design features as:

- Timken Roller Bearings
- Positive Lubrication — Self-oiling
- Carbon-free Disc Valves
- Automatic Pressure Unloader
- Precision Construction Throughout

Curtis Air Compressors are available in sizes from $\frac{1}{4}$ to 50 H.P. Write today for full information.

CURTIS PNEUMATIC MACHINERY DIVISION

of Curtis Manufacturing Company

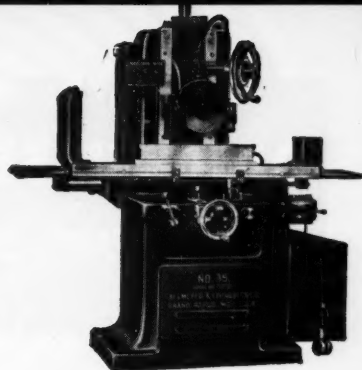
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• St. Louis 20, Missouri

F 582B

94 Years of Precision Manufacturing

**Every working day
thousands of plants
all over the world
prove the....**

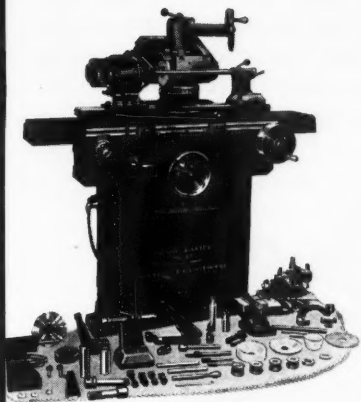


**Grand Rapids No. 35
Hydraulic Feed Surface Grinder
Complete Information in Bulletin GL-101**

Unqualified Excellence

of GRAND RAPIDS GRINDERS

here's why • Every Grand Rapids Grinder, large or small, has every essential feature for fast, efficient, low-cost production. Refinements in construction details such as the massive castings, heavy, rigid spindles, separate spindle motors, assure years and years of trouble-free life. Grand Rapids No. 60 Universal Cutter and Tool Grinder and No. 35 Grand Rapids Hydraulic Feed Surface Grinder will handle all of your tool room jobs from grinding of dies to sharpening all types of milling cutters, reamers and similar tools.



**Grand Rapids No. 60
Universal Cutter and Tool Grinder
Complete Information in Bulletin 2-28-46**

What "GRAND RAPIDS" quality means:

Gallmeyer & Livingston cast their own close-grained gray iron, machine to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means top quality in grinding machinery.



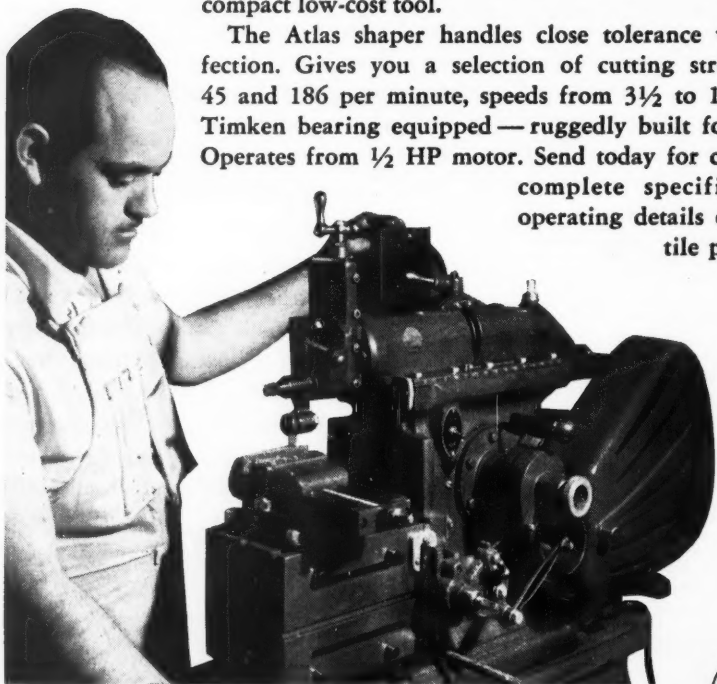
GALLMEYER & LIVINGSTON COMPANY

QUICKER SET-UPS ON SMALL PARTS OPERATIONS

Atlas 7" SHAPER

"Match the machine to the job" is an idea that is tremendously helpful in tool room and shop . . . and especially valuable in shaping operations. Most of them are within the 7" stroke of the Atlas shaper. You can save considerable on set-up time, machine hour and power costs with this compact low-cost tool.

The Atlas shaper handles close tolerance work to perfection. Gives you a selection of cutting strokes between 45 and 186 per minute, speeds from $3\frac{1}{2}$ to 116 fpm. It is Timken bearing equipped — ruggedly built for heavy cuts. Operates from $\frac{1}{2}$ HP motor. Send today for catalog giving complete specifications and operating details on this versatile precision tool.



ATLAS PRESS COMPANY

246 N. PITCHER STREET • KALAMAZOO 13D, MICHIGAN





Foolproof Air Control

Norgren Lubro-Control Units automatically clean, control and lubricate air power . . . boost performance, cut wear and reduce maintenance in air driven tools and cylinders.

Compact, streamlined assembly of filter, regulator and lubricator, easy to install in any air line.

- **filter** stops all solids and eliminates moisture and oil emulsion.

- **regulator** accurately controls air power for smoother performance with less secondary pressure drop than conventional regulators.

- **lubricator** oils the air that drives the tool. Protects against wear while tool operates; against rust and corrosion while tool is idle.

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Savings

LOOM MORE IMPORTANT IN 1948

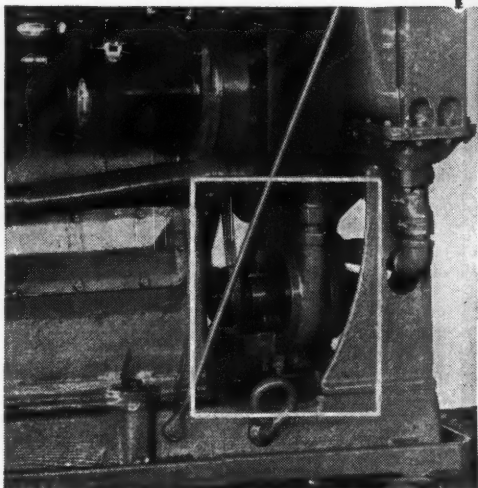


CENTRIFUGAL COOLANT PUMPS

SAVE MACHINE TOOLS AND PRODUCTS

CORRECT cooling results only when correct coolants are delivered uniformly and constantly to the right spot. This every FULFLO COOLANT PUMP does day in and day out . . . just as it performs in circulating the cooling water of the engine shown here, made by Universal Motor Co., Oshkosh, Wisconsin.

FULFLO ENGINEERS will gladly give you the correct answers to your coolant problems.



Write on your letterhead for
FULFLO MECHANICAL DATA BOOK



Specialties Co., Inc.
BLANCHESTER, OHIO



New!
DUMORE
DRILL
SPEEDER

Solves
Small-Hole Drilling
Problems at Minimum Cost . . .

High-speed attachment fits any standard drill press

Convert any standard drill press into a high-speed production drill — *in one minute* — with the sturdy, self-contained Dumore Drill Speeder. Chucks right into drill press (with $\frac{3}{8}$ " straight, or No. 2 Morse taper shank), or in lathes, milling machines, and an infinite variety of special set-ups. *Saves you an investment in special high-speed drilling equipment!*

The new Drill Speeder supplies its own power ($\frac{1}{4}$ HP) for speeds up to 17,000 RPM. Both the motor and No. 0 Jacobs chuck are accurately balanced to give maximum life to small drills ($\frac{1}{8}$ " down to No. 80).

Solve your high-speed, small-hole drilling problems at minimum cost — with the new Dumore Drill Speeder!

Tear out this coupon and mail today for complete information on new **DUMORE** Drill Speeder!

The Dumore Co., Dept. B-33, Racine, Wisconsin
 Please send complete information on the cost-cutting Dumore Drill Speeder.

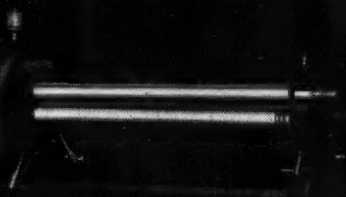
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America's Most Complete Line of
MACHINES AND TINNERS' TOOLS
FOR PLATE AND SHEET METAL WORK



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LS
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The tinner's tools and machines shown on these pages are just a few of the hundreds included in the complete Niagara line. There is an economical, productive and reliable press, shear machine and tinner's tool for every requirement for sheet metal job shops, plant maintenance departments and high production plants. Niagara hand, foot and power operated machines offer low first cost, low production cost and low maintenance cost. Write for catalogs.

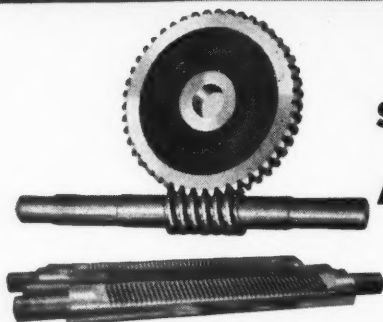
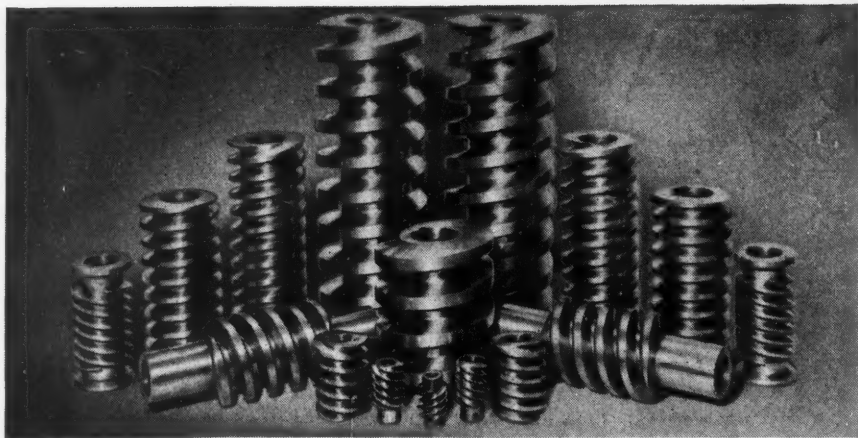
NIAGARA
Combination
Bench Machine

NIAGARA
Lever Punch & Shear

NIAGARA
Grinder

NIAGARA
Electric Combination
Machine

NIAGARA
Folder



Speed up assembly time with ADAMS custom made gears

Experience has proved that gears made especially for the job can often simplify and speed up assembly. Custom made gears can be designed with assembly problems in mind and save hours and dollars out on the assembly floor. While your product is still on the boards, plan on using Adams precision-made gears — built by craftsmen, exactly to your specifications. THE ADAMS COMPANY, 1942 Cypress Street, Dubuque, Iowa.

The ADAMS Line

SPUR GEARS
HELICAL GEARS
BEVEL AND MITER
GEARS
WORMS AND
WORM GEARS
SPROCKETS
INTERNAL GEARS
(Spur and Helical)
RATCHETS
SPLINED SHAFTS

RACKS
LEAD AND FEED
SCREWS
GROUND TOOTH
GEARS (Spur and
Helical)
SHAVED TOOTH
GEARS (Spur and
Helical)
GROUND THREAD
WORMS

The ADAMS Company

Dubuque, Iowa, U. S. A.

ESTABLISHED 1883

FINE GEARS MADE TO
YOUR SPECIFICATIONS



POPE PRECISION SPINDLES

*with Sealed
Lubrication*

P-172

P-4721

P-2641

P-1431

P-2463

P-1681

P-2461

P-1932

P-1004

P-2412

Shown above are a few random selections from the hundreds of special POPE Precision Spindles that have been designed and built to meet special requirements for precision and high production.

**YOU Name The Job. Then, Let POPE Design
And Build The One Best Spindle To Do It!**
Recommendations and estimates will be promptly furnished.

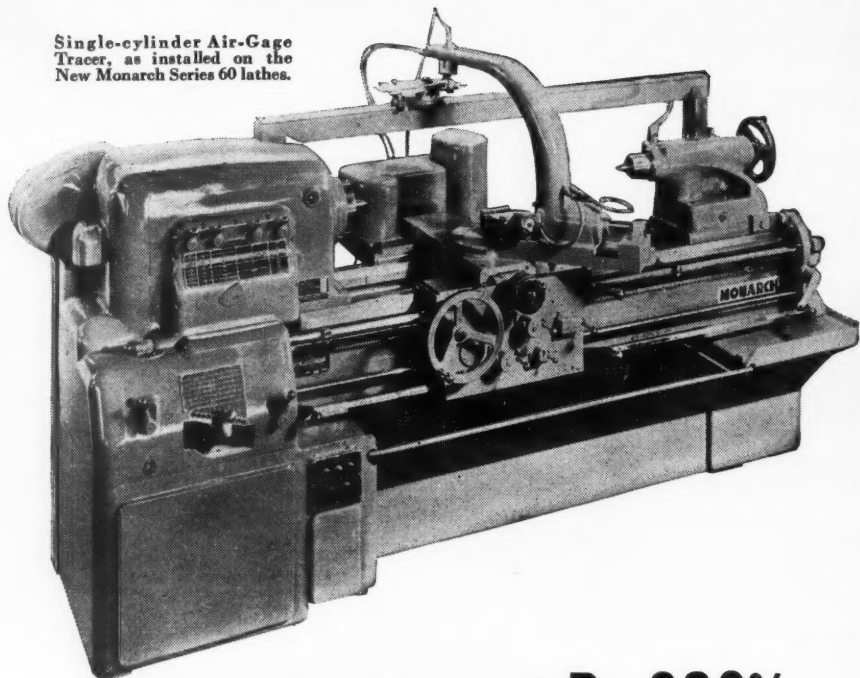
POPE

POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

Single-cylinder Air-Gage Tracer, as installed on the New Monarch Series 60 lathes.



SHAFT PRODUCTION UPPED 362%

With the New Monarch Air-Gage Tracer

Production time was cut from 174 hours down to 48 hours—for a large and representative lot of shafts.

This manufacturer's savings in time through the use of the Air-Gage Tracer is typical—as are the other savings made in this installation. Here's the story:

Shafts ranging in diameter from 3" to 4½" had been turned on modern manually-operated lathes, leaving .015" to .020" of stock for the grinding operation. Air-Gage Tracing holds diameter so closely (.002" on the average) that the stock left for grinding was cut in half. Grinder

costs decreased, too.

Here's the payoff. Two Air-Gage Tracer equipped machines replaced five manual machines for this manufacturer—and they're out-performing the original battery, with more production—of far higher quality.

Let us show you how these modern Monarch Air-Gage Tracer equipped machines can cut your costs on shaft work and turned or bored contours and tapers.



THE MONARCH MACHINE TOOL COMPANY • Sidney, Ohio

FOR A GOOD TURN FASTER — TURN TO MONARCH



RADIAC PRESENTS THE 23 PROCESS

There are many methods of making grinding wheels, but 23 process is a departure from the usual common place methods. It is a guarantee of constant and accurate duplication.

23 PROCESS MEANS—Strict control of all the elements of a grinding wheel with resulting uniformity of structure throughout . . . Outstanding Performance that is constantly duplicated . . . Uniformity of wear during entire life of wheel and from wheel to wheel . . . Less dressing—Less loading—Univalled life—

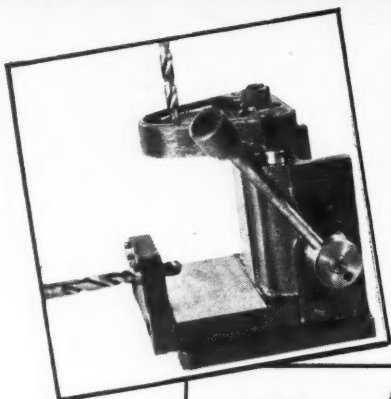
This wheel will stand up under the heaviest production jobs. Facts speak louder than words. Trial of a 23 process wheel will convince you.

A. P. de Sanno & Son Inc. PHOENIXVILLE, PENNA.



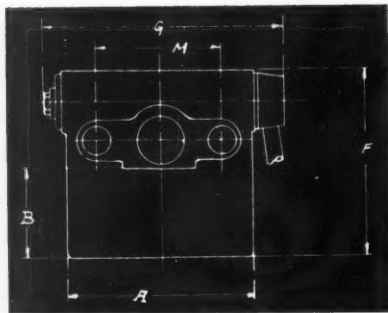
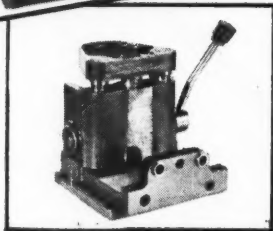
LIFT-SWING
PATENTED

Fixtures for DRILLING TAPPING - COUNTERBORING INSPECTION - at one setting



Lift-Swing in closed position.

Lift - Swing open — note absence of projection over work.



A—Range from $4\frac{1}{4}$ " to 8". B—Range from $2\frac{1}{4}$ " to 4". F—Range from $4\frac{1}{4}$ " to $7\frac{1}{4}$ ". G—Range from 6" to $10\frac{1}{4}$ ". M—Range from $2\frac{1}{8}$ " to $5\frac{1}{8}$ ".

If you want economy, the **LIFT-SWING** combination Drill Jig and Work Holding Fixture will satisfy your most exacting demands, for these very good reasons:

1. **DIE SET ACCURACY** — hardened and ground bushings—stationary guide and pilot pins maintain exact alignment at all times.
2. **TOP SWINGS ASIDE** — for loading and unloading — for performing other operations —for inspection of the work —without disturbing setting.
3. **TOP PLATES INTERCHANGEABLE**—a single base can be used for a number of different jobs by using a top plate for each.
4. **TWO POSITION OPERATION** —bearing faces permit drilling in two planes at right angles to each other.
5. **SIMPLE CAM LOCK** release and handle permit **FAST OPERATION**.
6. **COST** is much less than custom made jigs.
7. **11 Standard sizes.**

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MANUFACTURING CO.**

50 PERRY STREET,
BELLEVILLE 9, N. J.

SEND FOR NAME OF NEAREST SUPPLY HOUSE



DIAMOND
PENETRATOR
made only by **WILSON**

WE CAN'T TAKE CHANCES ON A 0.00008" TOLERANCE

• The "BRALE" Diamond Penetrator was designed by Wilson for use on the "ROCKWELL" Hardness Tester to test hardened steel—some hard alloys. Every one must be as nearly perfect as we can make it. Here's why:

A deviation in the indentation of 0.00008" (or 0.00004" in the "ROCKWELL" Superficial Tester) would cause an error of one point in the hardness reading. The reputation and universal acceptance of "ROCKWELL" Hardness Testers are based on dependable accuracy. We cannot risk the reputation and acceptance of "ROCKWELL" Hardness Testers by permitting any chance of error.

Every "BRALE" Penetrator is ground to shape under enormous magnification—tested on many test blocks in our Standardizing Laboratory.

WILSON

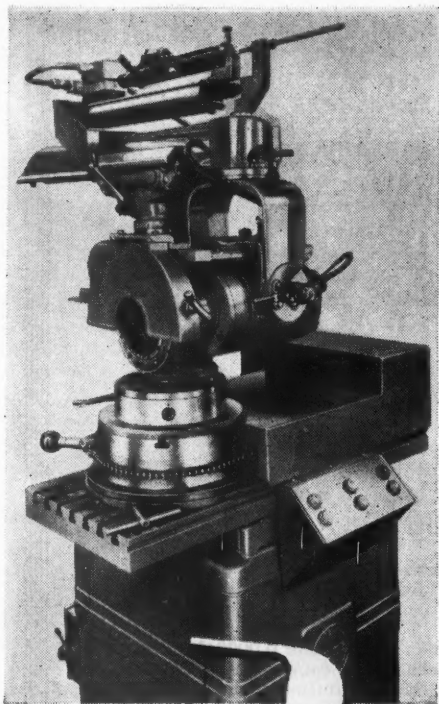
MECHANICAL INSTRUMENT CO., INC.
AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N. Y.

ACCO



TRADE
MARK



At the production rate of three pieces per minute, the S. K. Wellman Company of Cleveland, Ohio, is performing grooving operations on powdered metal aircraft parts approximately four times faster than ever before. This has been achieved by incorporating several automatic devices with a Standard Walker-Turner Radial Cut-Off Machine to convert it into an automatic radial grooving machine.

For this grooving operation the Radial Cut-Off Machine is equipped with a diamond impregnated metal wheel to do the cutting, and a magnetic chuck for work holding. The sliding head is motivated by an air cylinder with provisions for metering the feed. With this set-up extremely accurate work is done

**FOR
EXAMPLE**

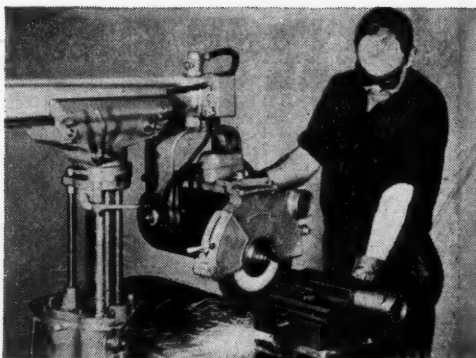
GROOVING OPERATIONS

**by S. K. WELLMAN COMPANY
with WALKER-TURNER
radial cut-off machine**

—the depth of each groove held within .003", and the accuracy of the index within .005".

In addition to increased production, Walker-Turner Machine Tools have given the S. K. Wellman Company continued operation with trouble-free maintenance. Says Mr. S. E. Truesdell of the company's engineering department: "Three Walker-Turner machines have been in our possession about five years, and in that period a very minimum, if any, maintenance has been required. We find these machines... *are highly adaptable to intricate machining jobs with minimum set-up time.*"

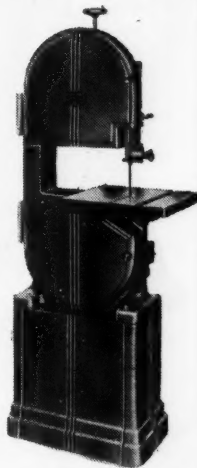
For complete catalog, write to Walker-Turner Company, Inc., Plainfield, New Jersey.



Photo, left: Radial Cut-Off Machine in S. K. Wellman set-up for radial grooving with magnetic chuck and diamond wheel. Indexes automatically at the end of each ram traverse cycle.

Photo, above: Radial Cut-Off Machine, Model MRA-1130, 3 h.p., 3450 r.p.m. motor. Price: Less abrasive wheel, magnetic overload release and base \$485.00.

14" Woodworking Band Saw, BN-905. Price: less base, motor, gear assembly and belt guard, \$129.50. For conversion to metalworking, speed reduction gear assembly and slo-speed motor available.



4 TIMES FASTER

SOLD ONLY BY
AUTHORIZED INDUSTRIAL MACHINERY
DISTRIBUTORS

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MACHINE
TOOLS

DRILL PRESSES—HAND AND POWER FEED
RADIAL DRILLS • RADIAL SAWS
METAL-CUTTING BAND SAWS
POLISHING LATHES
FLEXIBLE SHAFT MACHINES
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PRESS - RITE

PUNCH PRESSES

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INCLINABLE

FIVE
TO
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TON
CAPACITY



Many new features have been incorporated in the new models of PRESS-RITE PRESSES. A new improved clutch, a new positive single stroke attachment, improved brake, plus extra large die space, and many others.

PRESS-RITE PRESSES have been tested and approved after many years of service in large and small manufacturing plants, tool and die shops, small instrument manufacturers, etc. Investigate. Get all of the facts and complete specifications.

NO. 3
30 TON

See your local dealer or write
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Sales Service Machine Tool Co.

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ST. PAUL 4, MINNESOTA

Design Benefits for You with **NORMA-HOFFMANN**

"CARTRIDGE" BEARING

GREATER CONTACT AREA

IF IT ISN'T WIDE ENOUGH, IT ISN'T GOOD ENOUGH to meet today's design problems. Norma-Hoffmann extra wide "Cartridge" Bearing gives you 43% to 85% greater contact area between shaft and bearing bore and between housing and bearing O. D., as compared to the conventional width bearing. This eliminates the need for lock-nuts and results in greater shaft strength as it is unnecessary to cut locknut threads. Slippage and peening are also prevented.

In addition, the "Cartridge" Bearing gives you (1) Longer period between re-lubrication because it holds 100% more grease—(2) Added load-carrying capacity because full sized balls are used.

Also available under license from the Marlin Rockwell Corp., Jamestown, N. Y.

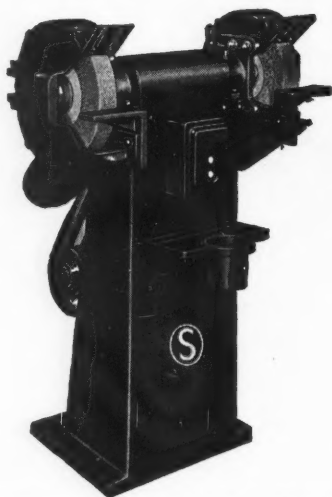
America's #1 Sealed Bearing



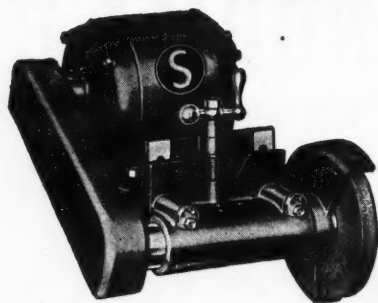
NORMA-HOFFMANN

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN.
FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh,
Cincinnati, Los Angeles, San Francisco, Seattle, Phoenix

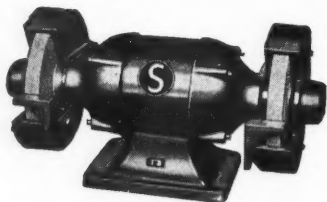
TOOLS FOR EVERY SHOP!



TYPE 2BDG belt drive 1 H.P. to 15 H.P. Longer wheel life, lower wheel costs, higher production!



TYPE BPA $\frac{1}{4}$ H.P. to 10 H.P. A 2-in-1 precision tool. Grind externally, and in a few minutes mount an interchangeable quill for internal grinding up to 24" deep!

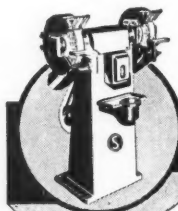


TYPE BAS $\frac{1}{4}$ H.P. to 1 H.P. Ball bearing equipped. Guards adjustable to wheel wear!



TYPE CA $\frac{1}{4}$ H.P. to $\frac{1}{2}$ H.P. Particularly adapted for grinding lathe centers, cutters, reamers, dies, rolls and various work on lathes, milling machine, shaper, planer or boring mill.

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for
Catalog
No. 43
Today**



The STANDARD ELECTRICAL TOOL Co.

CINCINNATI - 4 - OHIO

2487 RIVER ROAD

Manufacturers of STANDARD:

Grinders, Tool Post, Internal, Disc, Carbide, Vertical Spindle, Snagging, etc. $\frac{1}{4}$ H.P. to 50 H.P. Buffing and Polishing Machines up to 60 H.P. Speed Lathes.

Towers are measured by their shadows—(Old Proverb)

TAP EFFICIENCY IS MEASURED BY THE SHADOW OF PERFORMANCE

A True Guide
To Economy

Sustained Accuracy

HY-PRO Taps
stay accurate longer.

Their rugged construction, precision grinding and special heat treatment effect definite production economies through longer wear between sharpenings. Consistently producing more accurately threaded pieces per tap, these high production tools stay on the job longer to lower the cost of your tapping operations. In addition, their "sustained accuracy" permits the assembled parts of your product to be fastened tighter and stronger to resist the loosening effects of vibration. Specify HY-PRO . . . test them competitively on your toughest assignment . . . prove their greater efficiency and economy.

COMMERCIAL • PRECISION
SPECIAL Ground Thread Taps

Send your name to receive the
HY-PRO Stock List, mailed
bi-monthly on request.

Order Thru Your



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A Subsidiary of
Continental Screw Co.

TOOL CO.

New Bedford
Mass., U.S.A.

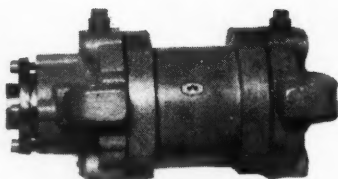
The Mark of Superior



Products and Service

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SIX STANDARD MOUNTINGS

PRESSURES FROM 150 P.S.I. TO 3000 P.S.I.
DIAMETERS FROM 1 INCH TO 24 INCHES



Deliveries Will Surprise You!

OTHER PRODUCTS: Hydraulic Power Units, Watertight Marine and Industrial Electrical Equipment, Electric Motor Armature Wedges.

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POWER PLUS PRODUCTS CO., Detroit 7, Mich.



• **DRILLING**

• **REAMING**

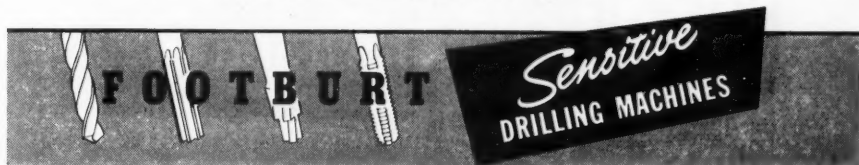
• **COUNTER
BORING**

• **TAPPING**

DRILLING-REAMING-COUNTER BORING-TAPPING-A CORRECT SPEED FOR ALL OPERATIONS...

Footburt sensitive drilling machines have proven their great value in tool and production shops thru their ability to handle so many varied operations. A wide range of speeds is instantly available. Their sturdy, accurate construction promotes a feeling of confidence in every good mechanic that uses them.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building





IT TAKES SOMETHING EXTRA TO BE A *Specialist!*

Navigation demands specialized knowledge, mathematical precision and resolute responsibility. . . not so much different from the characteristics required to produce BATH taps!

Toughened by hardening and tempering—then ground from the solid, BATH ground thread taps are "controlled taps"! All grinding is done on center holes (ground after the blank is hardened), thus holding all dimensions concentric with the tap axis. This means closer tolerances in all stock and special size BATH taps.

The name BATH on any tap represents our responsibility to consistently uphold a tradition of quality. See your BATH representative or write direct about your tap problems.

(Transportation is paid to your plant on all Bath products)

JOHN BATH CO.

INCORPORATED

20 Grafton Street
WORCESTER 8, MASS.

GROUND THREAD TAPS • PLUG AND RING TAPS • INTERNAL MICROMETERS

MORE WORK



LESS PLAY



With EX-CELL-O Grinding Spindles

It's the bearing that makes the spindle. In the Ex-Cell-O Grinding Spindle it's the precision of the bearing that keeps end and radial play at a minimum, permits high production speeds without loss of accuracy. That is why machine tool and other manufacturers rely on Ex-Cell-O grinding spindles for fast, accurate and economical production.



Write for this new complete catalog on Ex-Cell-O Precision Grinding Spindles. Bulletin No. 25962.

48—8

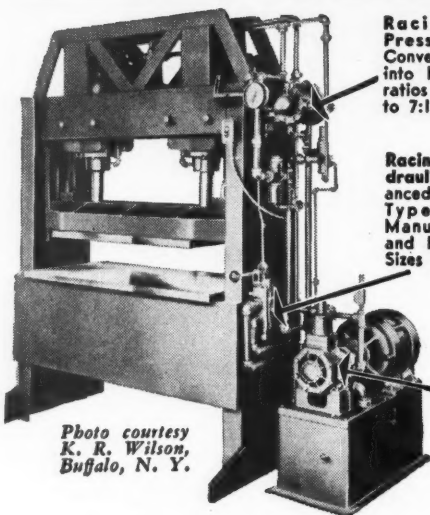
EX-CELL-O CORPORATION

DETROIT 6

MICHIGAN

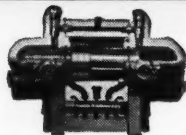


RACINE HYDRAULICS



*Photo courtesy
K. R. Wilson,
Buffalo, N. Y.*

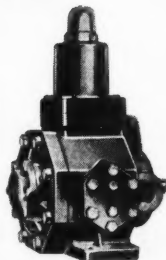
Racine Hydraulic Pressure Booster — Converts low pressures into high pressures in ratios ranging from 3:1 to 7:1.



Racine Four-Way Hydraulic Valve — Balanced Piston — Sleeve Type construction. Manual, Mechanical and Electrical control. Sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ ".



Racine Variable Volume Oil Hydraulic Pump — 12 to 30 G. P.M. Pressure 50 to 1000 lbs. p.s.i.



INTEGRATED TO YOUR DESIGN . . . centralized or remote control

Like this press manufacturer, you can readily give your products the advantage of a RACINE "Variable Volume", hydraulic circuit. This feature saves horsepower and reduces heat by simplifying the installation and eliminating unnecessary relief and bypass valves. Important savings in first cost also result.

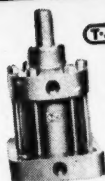
RACINE Hydraulic Engineers have developed hydraulic operation and control for hundreds of machines and tools. Their experience can be helpful in applying "RACINE Hydraulics" to your present product and on new designs now in the development stage. They will cheerfully review your problems in power movement, without cost or obligation.

Let us submit detailed recommendations and circuits employing pressures as high as 3000 lbs. p.s.i. Utilize the Variable Volume feature of RACINE Pumps and easy operating, long-lived RACINE sleeve-type valves. Ask for RACINE catalog P-10-C today. RACINE TOOL AND MACHINE COMPANY, 1770 State Street, Racine, Wisconsin.



RACINE

STANDARD FOR QUALITY AND PRECISION



T-J HYDRAULIC CYLINDERS

Many standard sizes and styles... both cushioned and non-cushioned types. 1000 lb. to 50,000 lb. (direct) power movement.



T-J AIR CYLINDERS

Wide range of styles, sizes and strokes. 100 lb. to 12,000 lb. (direct) power movement.



T-J CLINCHORS

Automatically feed and set clinch nuts in automotive body panels, door locks, other products. Save time and labor.



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Automatically feed and set rivets. Air powered for aluminum alloy rivets $\frac{1}{16}$ " to $\frac{1}{4}$ " dia. incl. up to $\frac{3}{4}$ " incl. long. Electrically powered for solid steel rivets $\frac{1}{16}$ " to $\frac{1}{4}$ " dia. incl. up to $\frac{3}{4}$ " incl. long.



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Die sinking milling cutters for accuracy, sturdiness and more work between grinds. All standard types and sizes.



T-J AIR CONTROLS

Designed for air cylinders in semi-automatic or automatic operating cycles. Easy to install.

SAVE LABOR on TOUGH JOBS with



This year—T-J labor-saving Products will be more important than ever to plant operators who want *increased production and lower costs!*

Check your needs now! If your plant has tough jobs for air cylinders... hydraulic cylinders... Rivitors... Clinchors... or air controls—specify T-J! You can depend on T-J to do the job *right*. All T-J products engineered with the know-how of more than a quarter of a century... precision-built for utmost *accuracy and dependability*.

The Tomkins-Johnson Co.
Jackson, Michigan

Send latest illustrated catalogs on the following T-J Products designed to *save labor* on Tough Jobs. No obligation.

☐ Hydraulic Cylinders ☐ Air Cylinders ☐ Clinchors
☐ Rivitors ☐ Cutters ☐ Air Controls

Name.....

Company.....

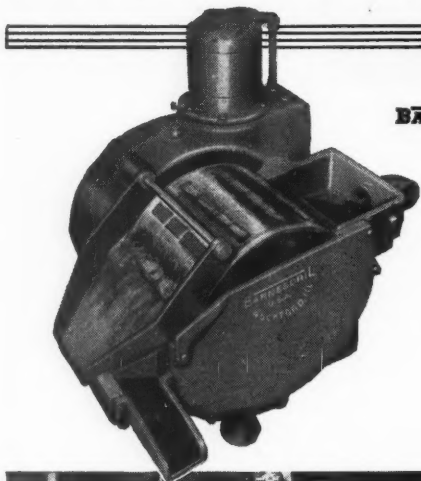
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TOMKINS-JOHNSON

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

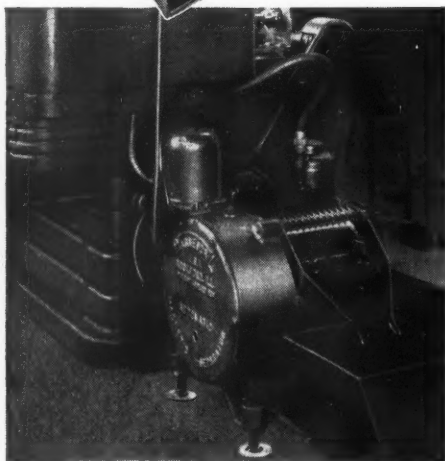
44 More Hours Per Month

RESERVED FOR GREATER MACHINE OUTPUT



BARNESDRILL Automatic Coolant Separators

- Reduce Machine Down-Time
- Prolong Coolant Life
- Keep Coolant Lines Clean
- Improve Work Finish
- Result in Fewer Wheel Dressings



● This prominent manufacturer* saved 44 man hours, and obtained 22 additional machine hours of productive time per month, by installing a **BARNESDRILL** Automatic Coolant Separator on one of his thread grinding machines. Before using the Separator, it was necessary to shut the machine down 2 hours a day, 11 days a month, to clean out accumulated sludge and sediment. Two men were required to service the operation. Now, with the Separator in use, coolant is cleaned *automatically*, and the machine does not require clean-out.

BARNESDRILL Automatic Coolant Separators are the easy, convenient, modern way to maintain high-production metal-cutting equipment. Easy to install, with low initial and operating costs, these Separators help to boost productivity. Write today for descriptive literature.

*Name on request.

BARNES DRILL CO.

860 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

SAVED

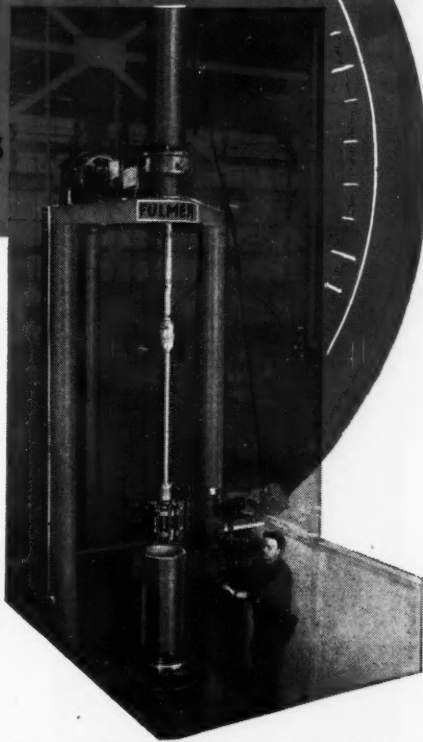
**1 hour 55 minutes
per piece**

**FULMER
Honing Machines
finish Diesel
Engine Cylinder Liners
*in 5 minutes***

At the Van Der Horst Corporation, best previous time for finish honing 12½" i. d. chrome plated Diesel cylinder liners was two hours. When the same job was put on a Fulmer, liners were finished to exacting tolerances in *5 minutes!*

Many manufacturers have realized similar savings when Fulmer Honing Machines were installed to finish a wide range of cylindrical bores. Honing on Fulmer Honing Machines is today's *fastest, most efficient* method for final cylinder processing. Any degree of surface finish from 1 to 20 micro-inches is automatically produced. Stock is removed fast—high accuracy is maintained. Tolerances can be held to $\pm .0001$ " on size, straightness, roundness.

Get more facts on how Fulmer Honing Machines will shorten your production time, improve quality, for finishing cylindrical bores. Write today for complete information, describing your specific work requirements. There is no obligation.



One of a battery of 3 Fulmer Honing Machines in operation at the Van Der Horst Corp., Olean, N.Y., finishing chrome plated Diesel cylinder liners.

C. ALLEN FULMER COMPANY

1233 First National Bank Bldg., Cincinnati, Ohio

FULMER

PRECISION PRODUCTION EQUIPMENT

★ Honing Machines • Rod Borsers • Piston Ring Lappers

Mark It for Market



Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling cost.

**TRADE MARKS—
MANUFACTURERS—
PART NUMBERS—
PERMANENTLY ROLLED
ON YOUR PRODUCTS
WILL HELP YOU MARKET
THEM.**

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

*Illustrated at the left is
Model 135 Production
Marking Machine.*

WRITE FOR CATALOG



GEO. T. SCHMIDT, INC.

**1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS**

STOP DUSTS

With Low Cost Individual
DUSTKOPS

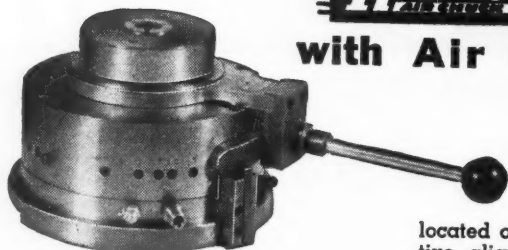
Dustkop Vapor Collectors stop mist and vapor from thread grinders, screw machines with the same low cost efficiency that Dustkop Dust Collectors stop dust and lint from grinding, polishing and buffing. They save heat. They also reduce colds.



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Send For
Catalog A-415
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"Air Devices by Redmer"



RC-5

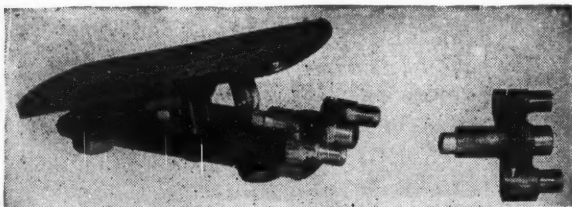
Redmer Index Chuck with Air Operated Collet

Eliminates removing chuck from base of machine for changing index position. Index screw posts located on OUTSIDE of chuck. Provides positive alignment and depth control by using stationary type collets. Capacity 1/16" to 2".



Air Foot Control and Valve

Designed to make its operation as tireless as possible. Opening and closing of plunger of valve on foot pedal is operated by a roller on pedal casting which relieves wear on plunger and facilitates operation. Valve is a brass casting which will take plenty of abuse and can be removed from the foot control and used as a separate unit in connection with cam operations.



No. FC-28

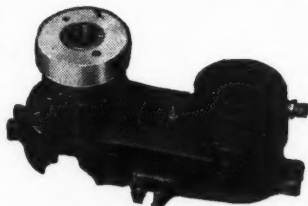
V-29



Collet Air Chuck

An air operated collet holding fixture using same type collets as Brown & Sharpe automatic screw machines. For drilling, milling, threading, etc., also for assembly work. Six models, No. 00, No. 10, No. 0, No. 2, No. 2 Special, No. 4, Collet Capacity 1/16" to 3 1/2". AVAILABLE WITH AIR EJECTION OR OIL FLUSHING.

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REDMER AIR DEVICES CORP.

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4 TONS of PRODUCTION

BENCHMASTER for every conceivable punch press application

Benchmaster is a small press doing man-size jobs. It does them more economically for two reasons: Exceptionally high speed of 285 strokes per minute and low initial cost. By lifting daily output and reducing machine investment, you lower manufacturing costs, add to profits.



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AUTOMATIC FEED with new BENCHMASTER FRICTION ROLL FEED!

Fits all Benchmasters and is adaptable to most other presses. Eliminates hand feed, adds to operator safety, speeds operations. Instantly adjustable for die height.
STOCK CAPACITY: 3" wide x $\frac{3}{16}$ " thick.
ADJUSTABLE FEED: 0" to 3" per ram cycle.
Mounts for either front or side feed.



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with the

MULTIPRESS*

Dial Feed Table



Your small parts processing can be speeded up *economically*—when you use the production-boosting team of the MULTIPRESS with Dial Feed Table. Crimping, pressing, marking, dimpling, stamping, broaching and shearing are but a few operations for which a table of this type may be adapted. Adjustments are included for regulating position of the table for greatest accuracy of indexing.

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Engineering Co.
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Standard shanks with Morse tapers carried in stock send us your specifications and blueprints — we will see that your job is set up with the right LIVE CENTER.

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TOOL COMPANY

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**PICK THIS
BLADE**



**to Cut
Production Costs**

For longer service—often eight to ten times the life of ordinary tungsten steel blades — the GRIFFIN SPECIAL ALLOY power machine blade is your best buy. Molybdenum high speed steel, with strong, raker-set teeth. Made also in hand frame sizes.

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For clean, accurate cutting of tough alloy steels, pick the GRIFFIN HIGH SPEED STEEL blade; 18-4-1 tungsten high speed steel; in power machine and hand frame sizes . . . For general hand frame use, pick the improved NEW GRIFFIN; flexible as a soft-back, tough as an all hard . . . For sawing thin sheet or tubing by hand, pick the GRIFFIN NON-STRIP, with the teeth that don't break off . . . For precision contour sawing pick GRIFFIN BAND SAWS—choice of hard-edge-flexible-back, spring-temper, skip-tooth and wood-cutting types.

Write us for latest illustrated Griffin Price List.

General Sales Agent

JOHN H. GRAHAM & CO. Inc.

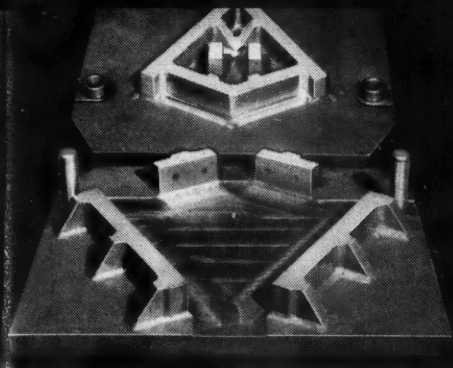
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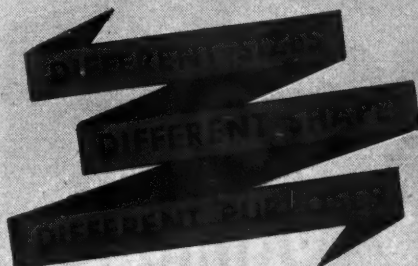
GRIFFIN 

**HACK SAW BLADES
AND BAND SAWS**

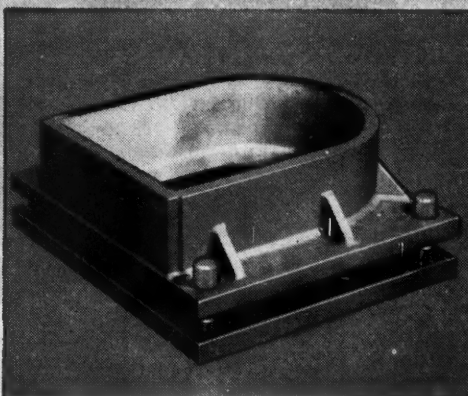
MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H.
Hack and Coping Saw Blade Specialists Since 1880



DANLY SPECIAL-PURPOSE DIE SETS



The same DANLY Precision



THE design, shape, size of a die set is determined by its purpose. Many tool designers and engineers have found that only *specially* designed and constructed die sets can do the job efficiently. Torch cut pockets, slots, bored die pockets, planed or milled keyways, drilled knockouts, slug or hold-down holes, welded steel mounting pads—all of these operations and more can be performed at Danly during production of the die set.

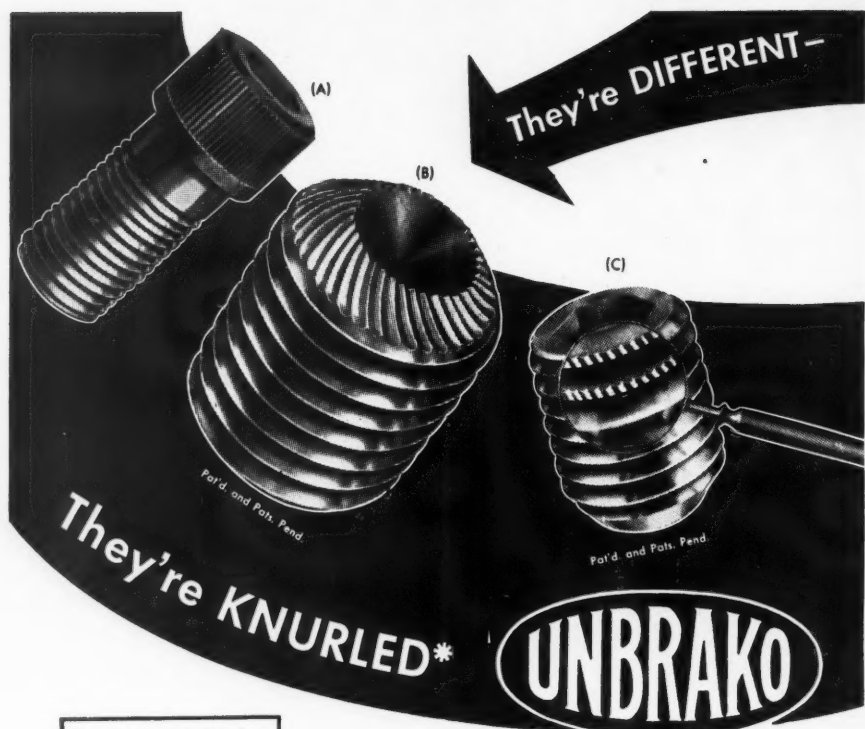
This service can be especially valuable to you in the production of large die sets. Additional cutting and welding operations, so easily handled at

Danly, may cause difficulty in the die shop or your own tool room where equipment is not specifically suited to large work.

The die sets shown on this page are typical of the kind of work performed in Danly's well-equipped shops. These sets are widely different, but all have the same *Danly Precision*. Freely consult Danly's engineering department for quotations.

DANLY MACHINE SPECIALTIES, INC.
2100 South 52nd Avenue • Chicago 50, Illinois
Branches in Principal Cities

DANLY *Special* DIE SETS
MACHINED TO YOUR SPECIFICATIONS



Knurling of Socket
Screws originated with
"Unbrako" in 1934.

(A) The knurled head of the "Unbrako" Socket Head Cap Screw makes it slip- and fumble-proof—be the fingers and heads ever so oily—therefore, it can be screwed in faster and farther before it becomes necessary to use a wrench. (B) The knurled cup point of the "Unbrako" Socket Set Screw makes it a *Self-Locker*—the point digs-in and *stays* dug—regardless of the most chattering vibration. (C) The knurling of this "Unbrako" Socket Set Screw, as shown, *swages* the threads so it becomes a most excellent *Self-Locker*—for use where the points such as: flat, dog, cone and oval do not lend themselves to knurling. Write for your copy of the "Unbrako" Catalog. "Unbrako" and "Hallowell" Products are sold entirely through Industrial Distributors.

Reg. U. S. Pat. Off.



Kits: Pats. Pend.

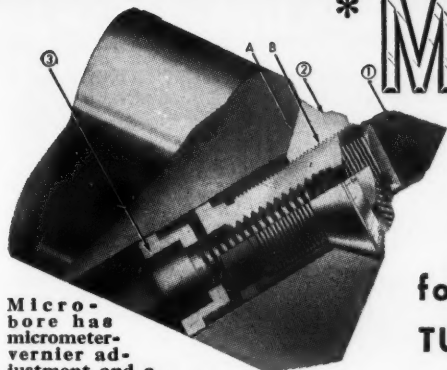
You can't tighten or loosen socket screws without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Handle Key Kit which contains most all hex bits.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

ENKINTOWN, PENNA. BOX 556 • BRANIHES BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

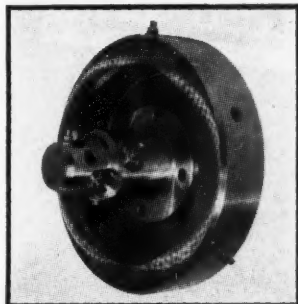
* MICROBORE



Microbore has micrometer-vernier adjustment and a positive rigid lock.

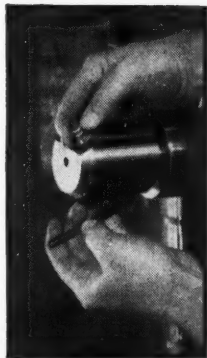
**A NEW
BASIC TOOL**
for PRECISION BORING,
TURNING AND FACING
OPERATIONS!

FAST DEPENDABLE ADJUSTMENT TO .0001" ON DIAMETER



Above: Example of cluster boring.

Below: For accurate adjustments to .0001" simply (1) loosen lock screw, (2) adjust collar to desired dial setting, (3) tighten lock screw.



Microbore is a new cutting tool with means for making fast adjustments dependably accurate to .0001" (one ten-thousandth) on diameter. It can be applied anywhere in single or multiple stations for roughing or finishing where high accuracy, high performance and accurate relativity between machined surfaces is essential. Adjustment to its finest increment of setting is made in 10 seconds.

Microbore consists of: (1) the carbide tipped tool bit cartridge threaded through (2) a cone shaped adjusting nut having a graduated dial, seated and locked firmly in the bar by (3) lock screw and washer assembly. The double cone seated relation (a) between the adjusting nut and

tool holder and (b) threaded relation between the cartridge and nut provides full rigid support of the tool up to the outer extremity of the graduated cone nut.

Its field of use is in production, precision tool and experimental work, for fast accurate setting and the elimination of cut and try methods.

Microbore may be applied in single or multiple stations for boring, turning and facing operations where such accuracy is obtained so fast as to practically eliminate machine down time for tool setting.

Control of precisely uniform form and shape of cutting edges is effected by grinding means that is a part of the Microbore system. Tools can be economically ground to precise requirements ready for installation and use. Write today for complete descriptive literature.


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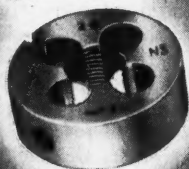
Cutting tool sales engineering organizations
required in a few open territories.

MICROBORE COMPANY
480 FAIR AVENUE
FERNDAL 20, MICHIGAN

BAY STATE



TAPS AND DIES OF ABILITY



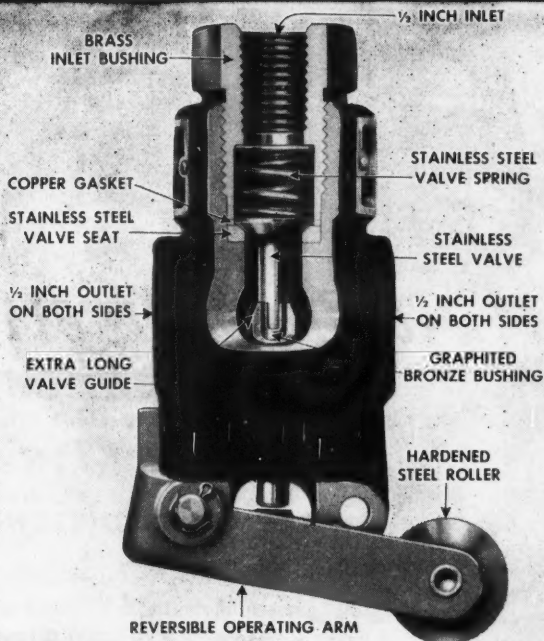
★ RELIABILITY ★ PRODUCTIBILITY
★ DURABILITY ★ AVAILABILITY

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MANSFIELD, MASS.

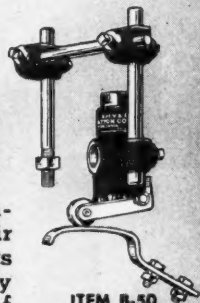
INCREASE MACHINE TOOL EFFICIENCY with

Palmer Shile **AIR SAVER** **AIR VALVE**



A real precision-built, leak-proof air valve that completely harnesses air power and assures split-second air control at all times. The easy-to-install Air Saver mounts in any position—operates at any angle—unaffected by vibration—provides ample air volume for operation of single or multiple jets. A natural where air is used for cleaning, drying, cooling, positioning or ejecting. Especially recommended around punch presses, die casting machinery, drill presses—and in reaming, broaching and other operations. *Immediate Delivery.*

Item B-100 (Valve Alone) \$10.00

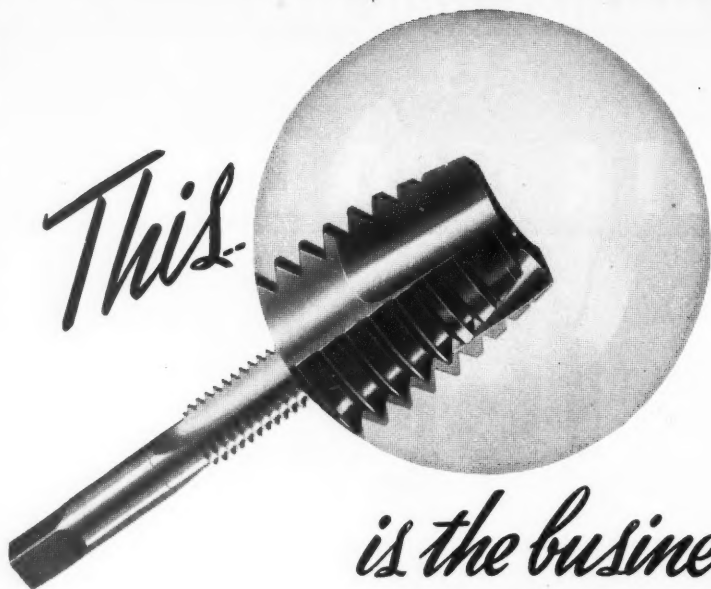


ITEM B-50
Complete Assembly
includes Valve,
Mounting Rods,
Operating Cam.

\$12⁵⁰

Palmer Shile Co.

16022 FULLERTON AVE. • DETROIT 27, MICH.



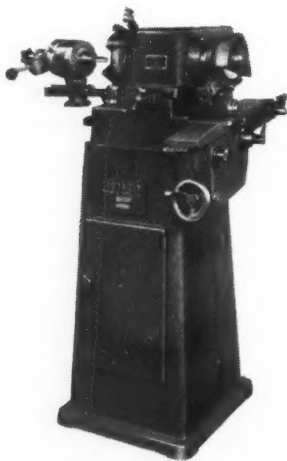
is the business end-

TAKE CARE OF IT

ON A

DETROIT

TAP RECONDITIONER



You can put worn taps right back in "good as new" shape with the DETROIT 4 in 1 tap reconditioner. It's like getting an almost unlimited supply of NEW TAPS for next to nothing, for this reconditioner is remarkably low in price—pays for itself in short order. It chamfers, grinds flutes (from 2 to 6), spiral points taps where required and polishes the points. Handles taps up to 1½ inch diameter.

*For complete information write or
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DETROIT

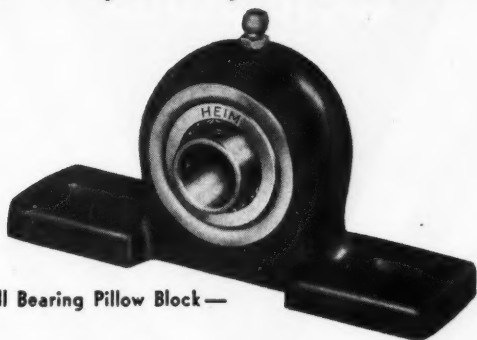
TAP & TOOL CO.

8432 BUTLER AVE. • DETROIT 11, MICHIGAN

The Home of "M-11" CHROME-COBALT HSS TAPS, THREAD MILLING CUTTERS & THREAD GAGES

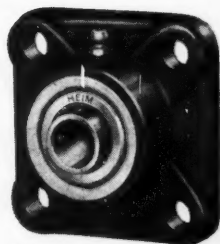
HEIM

Self Aligning Ball Bearing



Self Aligning Ball Bearing Pillow Block —
Cast Iron Body

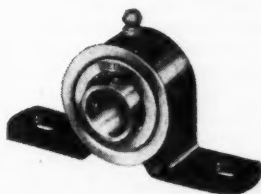
Double rows of balls travelling in carefully machined and heat treated inner and outer races so constructed that it corrects shaft misalignment in any direction. These bearings are self contained to retain lubrication and keep out dirt and foreign matter. Tell us where you require a self aligning flanged ball bearing and we will make recommendations.



Flanged Pillow Block Self
Aligning Ball Bearing Type



Flanged Ball Bearing Self
Aligning

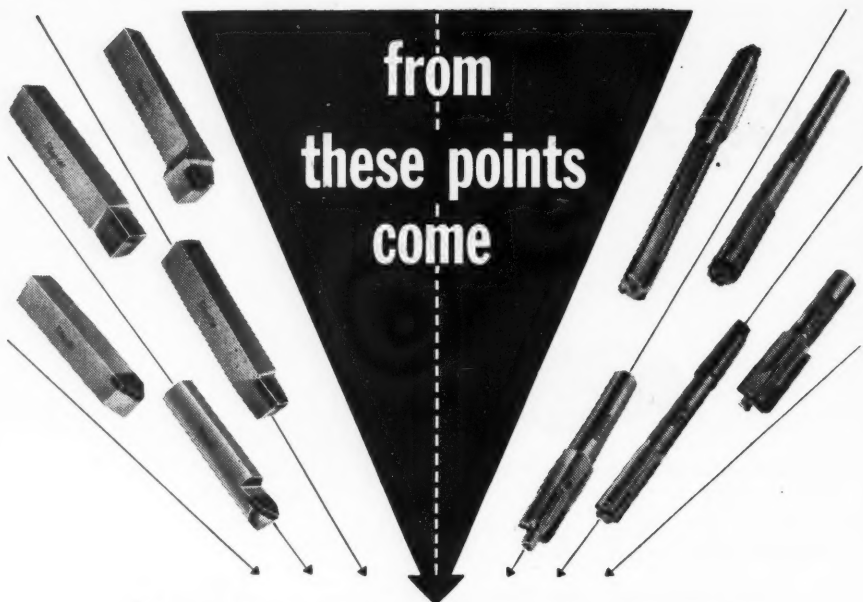


Self Aligning Ball Bearing
Pillow Block

THE HEIM
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CEMENTED CARBIDES

Tool up for higher production with Staples Carboley-tipped Tools. Now, Staples offers one of the most complete high-quality lines of carbide-tipped tools available today.

Get faster, deeper cuts from Staples single point tools—roller turner, turning, boring, facing tools—milling cutters, form tools.

Get precision hole production from Staples reamers, counterbores, end mills, spotfacers, core drills.

For all *special* tools, submit your requirements to Staples Design and Engineering Service.

To profit in higher production at minimum tool cost, make Staples your Carboley tool headquarters. Write today for complete information on standard tool designs and prices.

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write for your
complete
Staples Tool
catalog

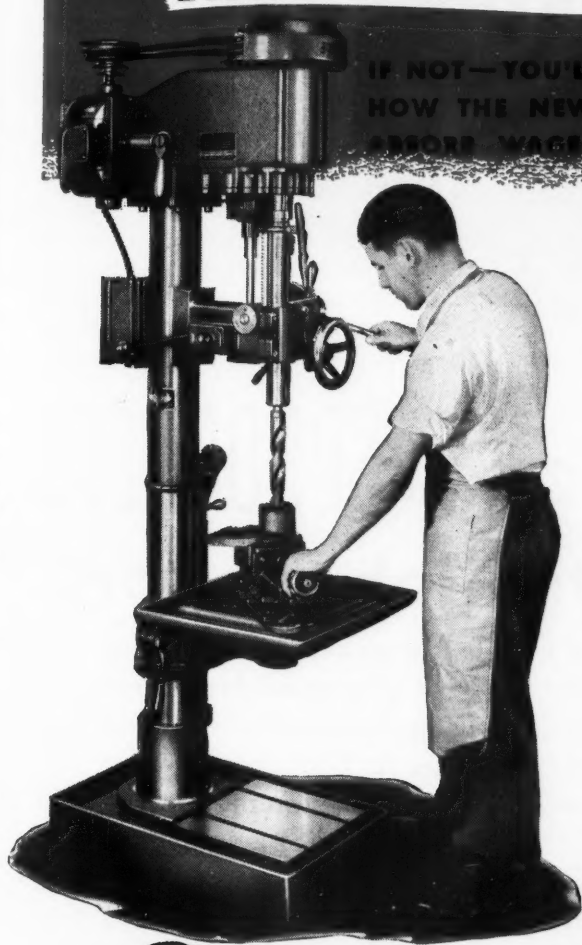
Staples CARBOLOY CEMENTED CARBIDE TOOLS

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS
EXPANSION REAMERS • FORM TOOLS • CENTERS • MASONRY DRILLS • SPECIAL TOOLS

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Time and Motion study

IF NOT—YOU'LL SOON DISCOVER
HOW THE NEW C-20 SIBLEY CAN
AFFECT WAGE INCREASES



You say—Only by more output can costs be cut!

All right—compare T. & M. studies on your present equipment with this 20" Sibley drilling and tapping machine. The difference will surprise you!

You have easy access to controls—turn a knob to select the proper geared power feed. A lever allows convenient shifting of V-belt. This Sibley is a precision tool for sensitive drilling at high speeds, but has ample power to drill $1\frac{1}{2}$ " in mild steel. 8 speeds range from 65 to 1360 RPM, driven by a 2 H.P. motor.

SEND FOR CATALOG NO. 67.
Get complete details to compare with your present equipment.

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Send Catalog No. 67.

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SOUTH BEND 23, INDIANA



9 times
out of 10

CULLMAN *Stock Design* SPROCKETS

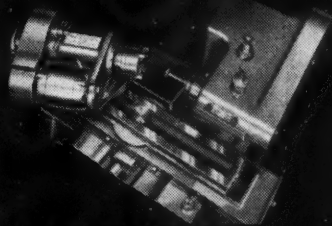
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With many types to select from—you are almost certain to find just the size you need for practically every transmission requirement — *ready for immediate delivery*. Cullman Sprockets — produced by fast, low-cost, high-precision methods — assure top operating efficiency. "Specials," too, are *quickly available* — made up by exclusive Cullman methods and specialized equipment.

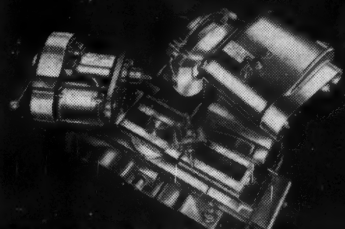
CULLMAN WHEEL COMPANY

1352 V. Altgeld Street

Chicago 14, Illinois



*Internal grinding head
with work head swiveled.*



*External head swiveled with
quick collet closing attach-
ment and radius dresser.*

Now manufactured by ARTER, this hydraulic grinder can be obtained as an external grinder or as an internal grinder or with both grinding heads. External capacity — 3" diameter by 10" long; internal capacity — $\frac{1}{8}$ " to 3" dia. by 4" long. Swing-over table is 9".

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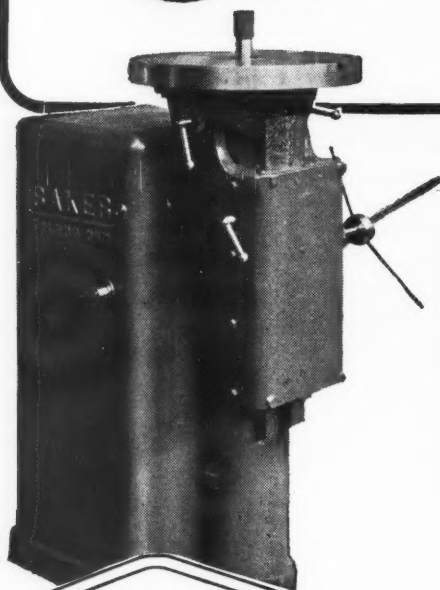
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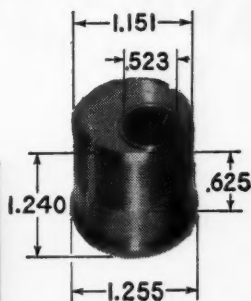
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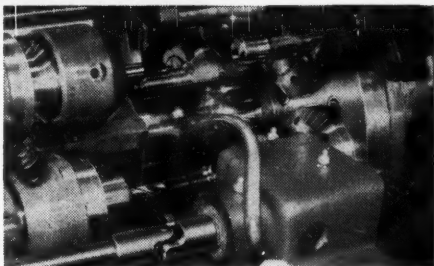
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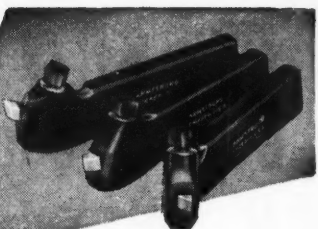
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MODERN Machine Shop

FEBRUARY, 1948

VOL. 20, No. 9

CINCINNATI, OHIO

This Month

"Progressive Die Design," which is the title of the feature article this month, covers a subject which should be of prime interest to die designers, estimators, manufacturers who make their products of steel stampings, and production men generally. This article is the first of a series of three, written by a man who has spent a lifetime in the making and designing of dies of all descriptions. The second and third articles will follow in succeeding months. Page 124.

The third of E. R. Yarham's series on "Spinning and Panel-Beating of Aluminum Alloys" is presented on page 132. This is the final article of a series in which the author discusses British methods and tools for shaping aluminum alloy sheet. The series has been very well received and sometime later we will present further articles from this well-qualified British engineer.

The manner in which the engineers of Detroit Gear Division of Borg-Warner Corporation achieved efficient balance in the production of gears for the transmission of a 1½-ton truck is described in the article "Balanced Production at Detroit Gear" on page 154. The article contains some ideas which will be worthy of study by planning engineers.

It seemed to the editor that the development of a stainless steel which has qualities that make it resistant to the corrosive effects of sulphuric acid and similar substances, and which is available for the first time in bar, wire, strip and tubing form, was sufficiently important to be regarded as feature news. The properties of the new product, which is known as Carpenter Stainless No. 20, are described in an article which begins on page 170.

Several excellent special tools and devices are described in the department "Ideas from Readers" and the new machine tools and other plant equipment that has been developed in the past few weeks are described and illustrated in the "New Shop Equipment" section. Page 194.

The "Where to Get It" section—page 360—will help you to locate the machines and tools you are searching for. If you don't find such tools advertised, write to the editor of this magazine and he will supply you with information as to manufacturers.

Progressive Die Design, I

Progressive dies offer advantages which should be realized whenever possible in the production of duplicate parts from sheet metal, because these tools are fast, accurate, and profitable. This article is the first of a series of three on this subject.

By C. W. HINMAN
Designing Engineer

WHEN only a few pieces are to be made and shaped from sheet metal, it is usually most economical to cut and punch the pieces to shape with hand or hand-operated tools. When a few are to be made, the simplest die that can be made is the best, but when the production required is to run into many thousands, first consideration should be given to the possibility of using a progressive die.

The progressive die was a natural development of the so-called "cut-and-carry" machine that came into use in

Connecticut metal-manufacturing centers about eighty-five years ago. Cut-and-carry machines were designed to fabricate metals by performing various kinds of cutting operations at consecutive work-stations while the work was being passed along on a table in front of the cutters.

This idea suggested a principle of design that seemed to offer the best advantages for the crude punch press tools used in that day. The principal objective was to avoid cutting light metal blanks clear through the die, thus making it possible to recover them for further processing with the same tool. It was found that the blank contour could be trimmed in the work strip and left connected to the strip on the surface of the die block.

The idea was to trim the blank outline with notching punches placed at either or both sides of the work strip, and to pass the strip along, after notching it, into several consecutive stations ahead for performing subsequent operations on the same piece of work. Like all new ideas, progressive die design developed slowly, and it was not until we entered the first World War that the progressive die really became an important factor in the mass

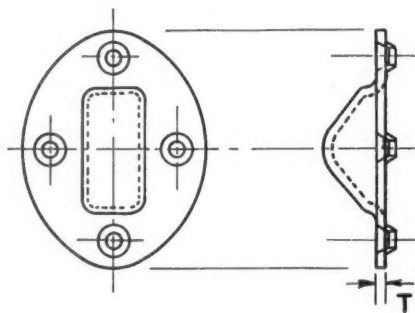


Fig. 1—Drawing of an escutcheon to be produced at high speed from soft drawing steel, one piece at each stroke of the press.

production of interchangeable parts.

When designing the die to the blank outline, the die must be designed so that a narrow connecting neck of metal will be left between the blanks for the purpose of passing the blanks along with the strip for additional operations ahead. By using this method it is possible to pierce holes, cut the blank outline, shallow draw, emboss, form, bend, or whatever is needed, at consecutive stations, and in the final

strip; a narrow neck is left between the blanks, and no scrap frame passes out of the die. In some cases two necks are left instead of one. This design is sometimes called a "no scrap die." The other design is used when it is necessary to cut the finished work out of the work strip, leaving a scrap frame as shown in Fig. 2 and 3.

There are also two methods available for designing the die itself. One is used when the cutting and forming

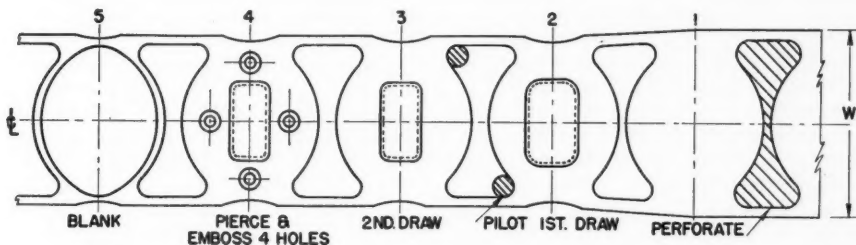


Fig 2.—Development of scrap strip, showing the order of consecutive die operations.

station cut off the finished work intact. If drawing, swaging, or embossing distorts the work, these operations can be performed first with notching, trimming and piercing following at their respective stations.

All these operations are performed on the faces of the die blocks, and scrap is eliminated through die openings provided in the usual manner. Scrap is segregated from the finished work because the slugs fall out at intermediate stations beneath the die. The finished piece is cut off in the last station and either slides off behind the press, if it is tilted back, or is blown off by compressed air into a container beside the machine.

The designer usually has a choice of two methods for designing the scrap strip for progressive dies, and the method selected is important because the scrap strip determines the die design. One method is used when the size of the blank equals the width of the

operations can be performed on the surface of the die blocks, with the dies anchored to the die shoe and the punches aligned above them and attached on the punch holder. This design is the conventional method. The other method is used when one or more drawing operations are to be performed and the inverted design becomes necessary. In this case the work strip is fed over a spring-pad stripper plate, the punches being anchored to the die shoe with the dies attached to the punch holder above. In some cases a combination of these two methods is necessary, as shown in Fig. 3.

Progressive dies can be operated successfully in an ordinary gap-frame press, but such presses are usually too slow for fast production. However, the Multislide machines, Dieing Presses, and Super-Speed presses, to name a few, are especially designed for using progressive dies, and for high speed production work.

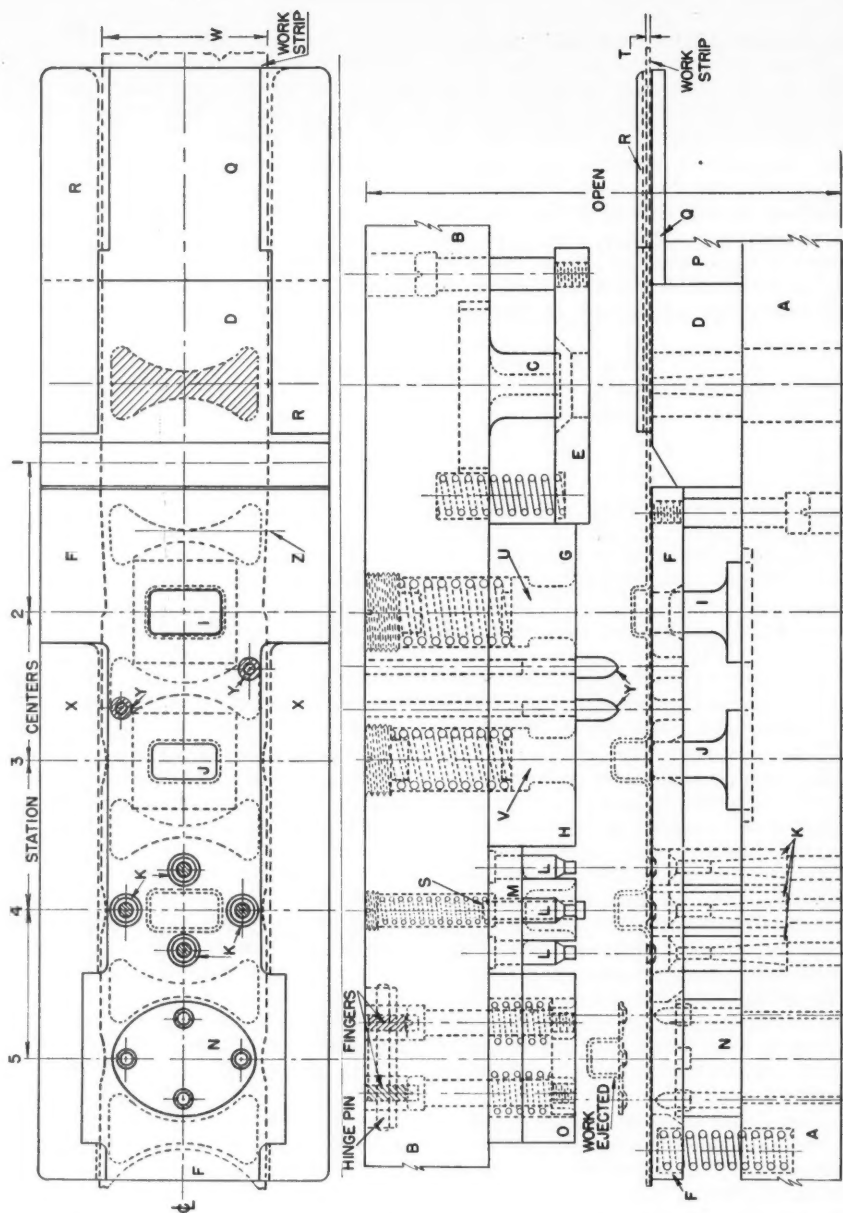


Fig. 3—Design of press tool as developed from the scrap strip. The drawing shows the five progressive stations, indicates the mechanical operation performed at each station, and illustrates the usual drafting technique.

In addition to the feature of fast production, the progressive die offers the advantage of economy in the use of work material. A recent case in which the width of a phosphor bronze strip was reduced only $\frac{1}{16}$ inch for progressive operations, and 125,000 blanks were required daily, the savings in cash amounted to over \$5,000 annually—enough to pay for the designing and building of the tool. The saving was a direct result of the high output.

The use of progressive dies makes possible the use of a minimum width of strip and also of blanking centers—advantages which save a lot of cash if the work material is expensive and the output is large. Another gain consists in that the press can be usually run "wide open," which means that the clutch is engaged continuously until the entire length of work strip has passed through the die.

It is obvious, therefore, that the most economical length of strip for continued production is the longest one that can be obtained, and so large coils of strip stock are used. In operation, the coil is fed from a reel mounted beside the press; the reel unwinds the strip as needed. Automatic feeding rollers, or a "hitching along device," are employed to feed the strip over the dies. An oiling pad positioned on the strip in front of the feeder lubricates the strip as it enters the die.

The usual run of workpieces produced with progressive dies includes parts made from light gauge metals such as small springs, clips, brackets, hinges, terminals, connector lugs, machine gun belt links, cartridge clips, gun lock and instrument parts and so on. The list is endless. Most of the parts are used in the radio and electrical industries.

Sometimes the work strip is of "tinned stock." Strips may be purchased tinned on either one or both sides. The tin coating does not interfere with the operating qualities of the dies; on the

contrary, it really improves the fabricating qualities of some metals, especially where drawing operations are done. Tinning facilitates drawing operations.

Perforating, Drawing, Piercing, Embossing, and Blanking Steel Escutcheon Plates

The drawing Fig. 1 shows the workpiece as completed. A piece is produced at each down-stroke of the press ram. The work material is No. 18 U. S. Gage (0.050 in.) soft deep drawing steel, usually designated S. A. E. 1010.

In designing the die, it is necessary, first of all, to develop the contour of the blank from Fig. 1. This is done in the usual way, by computing the area of the finished piece and then laying out a blank of equal area plus a scrap frame border which must be provided around the piece for blanking it from the strip. Lay out Fig. 1 five sizes, then develop the blank to the same scale including its border allowance, as mentioned above. Use $T/2$, which is the center line of the stock thickness, for computing the area and the blank.

Next, the scrap strip is laid out. See Fig. 2. If the designer has determined scrap strip correctly, he has done about one-third of the entire job, because the scrap layout decides the die design and the order of consecutive operations. Great care should be exercised to place each operation where it should be, otherwise the die cannot be guaranteed trouble-free, and may be a complete failure. In such an event it would be necessary to disassemble the entire die and rework it correctly. Of course job selected as an example is a simple one for which to design a scrap strip correctly, but for more complicated work several days might be required to produce one correctly. Avoid haste in laying out the scrap strip design, as so much depends upon its development.

Description of Die Operations

In the illustration of the press tool, Fig. 3, all the through holes in the dies are section-lined for clarity. This die is built upon a four-post commercial die set, only a part of which is shown in the drawing. The names of the principal tool parts follow: **A**, die shoe; **B**, punch holder; **C**, perforating punch; **D**, perforating die block; **E**, spring pressure pad; **F**, spring stripper plate; **G**, first drawing die; **H**, second drawing die; **I**, first drawing punch; **J**, second drawing punch; **K**, piercing and embossing dies; **L**, piercing and embossing punches; **M**, punch plate; **N**, blanking punch; **O**, blanking die; **P**, table support; **Q**, table; **R**, stock strip guides; **S**, spring push off pin; **T**, stock strip thickness; **U**, die shedder in **G**; **V**, die shedder in **H**; **W**, width of stock strip; **X**, scrap strip guides; **Y**, pilot pins; **Z**, score line for starting new strip.

Work strip **W** is fed from right to left through a set of automatic feeding rolls (not shown) at the right of the die. To start in a new strip, the operator throws forward a hand lever that disengages the rolls and then advances the forward end of strip in line with the left end of guide strip **R**. Next, he "trips the press," the punches descend, and punch **C** perforates the first opening in the strip.

The perforated opening determines the proper open space between blanks, and provides sufficient unattached metal for punches **I** and **J** to draw upon in order to complete the drawn shell on the escutcheon. The strip is then advanced until the second arc in the perforated opening coincides with score line **Z**, as shown in the illustration. At the next punch descent, another opening is perforated in the strip, and the first blanking center distance has been established.

We have now produced the first blank as position 1, ready to be ad-

vanced into the succeeding four stations for the operations that follow. It would probably be better to substitute a positive finger stop in place of score line **Z**, but that is not necessary for a reliable press operator.

The next move is to pull out and clip off the first end of the strip and bend the scrap prongs slightly toward one another. The strip is then reinserted in the die and the second arc in the perforated opening is advanced to score line **Z**. The first blank now lies over punch **I**, ready for the first drawing operation.

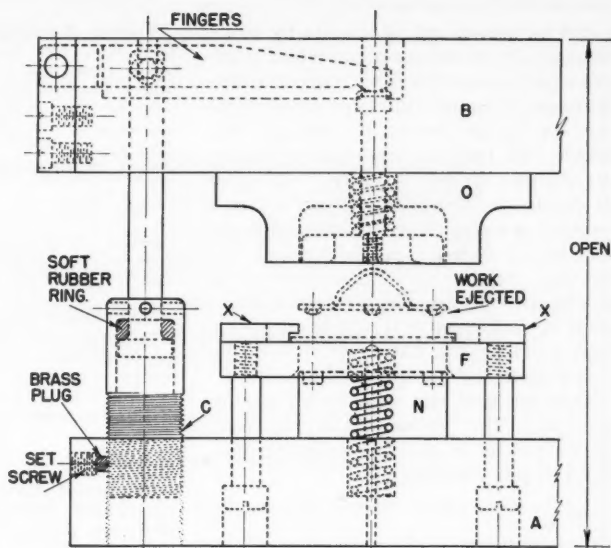
When the punches descend again, pilot **Y** aligns the strip and punch **I** makes the first draw up into die **G**, in the process of which spring-pad **F** is depressed. When the punches ascend, spring-shedder **U** ejects the work from die **G**, and spring-pad **F**, in ascent, "strips the work" from punch **I**. The feed rolls are then put into engagement on the strip, and the job is now ready to be run at high speed tempo.

It should be stated here that while the process described above may seem rather too long for starting a new strip, it is not nearly as long as is the case in some progressive die work. The starting process is really accomplished in less than a minute and a half.

The operations are now run continuously by engaging the press clutch permanently. Pilots **Y**, in descent, enter the diagonally opposite corners in the perforated opening, which aligns the strip and determines the station centers accurately. In the third station the second drawing operation is completed by the same process as just described for the first draw.

In station No. 4, the four holes are embossed into dies **K** and the punches, continuing to descend, pierce the holes and spank the embossments. The pierced slugs fall out beneath the press. Notice that punch plate **M** has a central extension, the interior of which fits over the drawn shell body;

Fig. 4 — Drawing of left-hand end of die showing the automatic ejector which pushes out the finished work in the last station. Ejection occurs near the extreme ascent of the press ram.



this feature ensures correct locations of the four embossed holes in the blank. Spring push-off pin S ejects the shell when the punches ascend.

It will be observed that the heights of all the punches that slide through stripper plate F are suited to their particular operations, while the upper members for drawing, embossing, piercing, and blanking are all in the same plane. Therefore, when resharpening the cutting members by grinding, it is necessary to "shim up" the cutting punches in order to maintain this important relationship between their heights.

In the fifth and last station we have a somewhat unusual die operation. Here the oval-shaped blank is cut by blanking punch N against the cutting edges of blanking die O. When the punches ascend, the blank has been cut into blanking die O and ascends within it. The blanking die is provided with a spring-pad ejector which lies above the work. However, the springs have been purposely made too weak to eject the work, for reasons which will be discussed later. As the blanking die ascends, at a point near its extreme height the hinged fingers operate automatically to eject the work positively, and in unison with the springs.

Figure 4 illustrates the operation of the automatic ejector. A soft rubber ring is used in cylinder C so that when the punch ascends to near its extreme height, ejection will not occur too suddenly. The rubber ring also prevents over-stresses on the mechanism when setting up the die in a machine that may have a press stroke greater than is ordinarily used. To prevent this possible trouble, the punch holder is stamped: **USE THIS DIE WITH A PRESS STROKE UNDER 1½ IN.**

However, cylinder C is equipped with a long screw adjustment to suit different press strokes; thus the die-setter is enabled to make the necessary adjustment. Usually, when a positive ejector is used, the station in which the ejection takes place is located under the punch shank on the punch holder, so that the standard ejector bar which comes with the machine can be used. But in progressive dies that favorable situation seldom occurs.

The reason for having the springs too weak for ejection is to permit carrying up the work to a height where

it can be blown out of the die by compressed air at the moment when positive ejection occurs. There are five advantages in using this type of ejector; (1) for large work, it relieves the knock out pad of bending moments, (2) the ejector pad for large work can be made to reach all points where ejection is necessary, (3) the pad itself can be of minimum thickness, (4) ejection is sure and positive at all points, and (5) the work is not ejected until it has been carried sufficiently high to clear the die when it is to be blown away by compressed air.

This job was run in a 50-ton dieing machine. The gross output is 7800 pieces per hour, and the press strokes are 130 per minute.

Dalhart Double-Acting Hydraulic Welding Gun and Booster, which are designed to provide for the production of more than 3,000 spots per hour, are illustrated and described in a four-page catalog published by the Dalhart Engineering & Manufacturing Co., 14827 E. Jefferson Ave., Detroit 15, Mich. In addition to blueprints of eight typical designs of the gun that may be adapted to a wide variety of work and various thickness of metal, the catalog includes a sectional detail of the booster which provides for the unusually high speed of the welding gun. Copy free upon request.

Goss & DeLeeuw 25th Anniversary. In commemoration of its 25th anniversary, the Goss & DeLeeuw Machine Co., Berlin St., New Britain, Conn., has published a 32-page board-covered book tracing the inception of the company in 1922 for the manufacture of automatic chucking machines and the progress it has made in the last 25 years in the manufacture of such equipment. The various officers and directors of the company are shown, and various models of automatic chucking machines produced by the company through the 25-year period are pictured and briefly described. Plant views are included showing the firm's complete facilities for the production of automatic chucking equipment.

Copy of the book is available free to mechanical executives addressing requests on their company letterheads.

Vulcan Equipment List. The Vulcan Tool Co., 730 Lorain Ave., Dayton 10, Ohio, now has available an eight-page folder illustrating and listing the facilities of the company for engineering, processing, designing, and building dies, jigs, gages, fixtures, special machinery, and so on. Copy free upon request.

Ideal Tank Type Cleaner, an all-purpose unit for general vacuum cleaning, scrap collecting, and water pick-up, is illustrated and described in a four-page folder released by Ideal Industries, Inc., 1031 Park Ave., Sycamore, Ill. Typical applications of the unit are shown in the folder, which also includes a drawing depicting the various construction features of the cleaner. Copy free upon request.

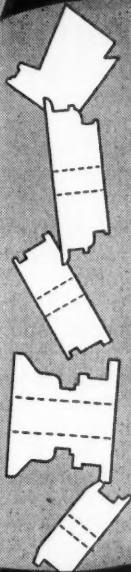
Cincinnati Hypro Planer Millers. The Cincinnati Planer Co., Cincinnati 9, Ohio, has published an attractive 44-page bulletin which fully illustrates and describes the line of Cincinnati Hypro planer type milling machines. The various outstanding features comprising the machines are individually illustrated and discussed. In addition, the bulletin includes specifications of the various size machines, as well as photographs and descriptions of special Hypro attachments and typical installations of the machines.

Copy of Bulletin No. 106 is free to mechanical executives addressing requests on their company letterheads.

Proficorder, a mechanical - electronic shop instrument which is designed to provide a magnified chart record of waviness, steps, and other irregularities on practically any machined or finished surface over a 2-inch length of trace, is featured in a four-page illustrated bulletin released by the Physicists Research Co., 321 S. Main St., Ann Arbor, Mich. The bulletin explains in detail the function of the instrument and outlines the possibilities thus provided in production and set-up inspection, in quality control, and in technical research and development. The operating principles of the instrument are also explained. In addition, typical Proficorder charts are presented showing how true profiles of stepped surfaces, fine roughness irregularities, and widely-spaced irregularities are produced by the instrument. Copy free upon request.

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Spinning and Panel-Beating of Aluminum Alloys, III

Final article of this series in which the author describes British tools and methods for hammering aluminum alloys.

By E. R. YARHAM

ESSENTIALLY, panel-beating is a hand method of producing hollow forms by means of hammering. Like forging, it is probably the most ancient of the metal-working crafts; its vocabulary is traditional and still

largely unstandardized, the terms employed varying from place to place and worker to worker. Nevertheless, the panel-beater's craft still retains its place in engineering and, as yet, is irreplaceable by more modern methods, so that, in spite of the tremendous developments in recent years of mechanical methods of forming, panel-beating remains, in Britain at least, an essential means of fabricating special parts.

Some shapes cannot be produced by mechanical methods and others only with great difficulty, and in such cases panel-beating is used to finish the shape that has been roughed out by power processes. Often, too, the prototype of a workpiece eventually to be made in quantity by stamping or pressing is hand-made in order to allow minor modifications to be studied before mechanical production begins. In such cases the part produced by panel-beating is used as the pattern for press or stamp tools. Panel-beating may also be used where a small number of parts only are required and where the



Fig. 5—Drawing Showing Method of Hollowing a Bowl

cost of press or stamp tools would not be economical.

The principles governing the panel-beating of aluminum and its alloys are, of course, the same as for those of other metals, though some modification in technique may be necessary, and it is essential that the panel-beater should be familiar with the various types of heat-treatable and non-heat-treatable alloys and understand their limitations and advantages. For the most part, aluminum alloys are used in the soft condition, either as supplied by the producers or by annealing before beginning, or during, the work. Since this is so, and panel-beating is essentially a hammering process, it may be worth while to go over briefly the kinds of blow that can be struck on sheet metal. It should be borne in mind that the aluminum alloys possess high malleability, and may be over-stretched even with a wood tool.

The types of blow that can be struck on sheet metal are three: (1) a **solid blow**, where the work is struck solidly over a solid metal head or anvil; (2) an **elastic blow**, where either the head or the tool (or both) is made of a resilient material such as wood; and (3) a **floating blow**, where the head or anvil is not directly under the hammer.

Each type of blow is recommended for particular purposes. A solid blow will stretch the sheet, and may be necessary when forming a panel, bending a curved strip or angle, removing a loose or tight place in a sheet, or throwing an edge over when thickness is not a consideration. An elastic blow will form metal without undue stretching; if desired, metal can be thickened, as in working out a tuck or pucker. The floating blow is given to the metal when it is held over a suitable head and hit "off the solid," so forming "dents" at the points of impact.

Technique of Panel-Beating. Light alloy sheet material up to 18 s.w.g., and in some cases even 16 s.w.g., can

be satisfactorily hand beaten by wood mallets into double curvature forms. The usual practice is to beat the metal in a suitable recess in a wood-block or upon a sand-bag, in what is known as the hollowing or blocking process. Alternatively, the metal can be hammered into a wood block hollowed out in the shape of the job. Another method is that of raising the metal by means

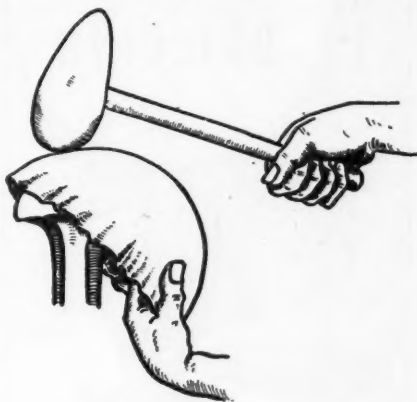


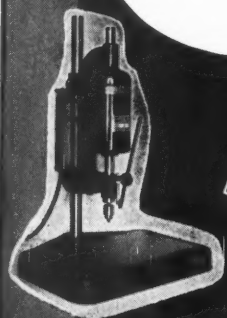
Fig. 6—Drawing Showing Method of Shaping a Bowl by Raising

of floating blows over steel or wood heads, or, in the case of simple shapes, on wood formers.

The raising process can be speeded up considerably by "taking in" or making tucks at the edges of the metal. This method is generally called puckering, and after being made, each pucker must be eliminated by careful blows to drive the metal into itself, thus thickening the work at the edges. Much greater advantage may be taken of puckering in aluminum alloy sheet than most metals, and, provided they are handled with skill, puckers may be larger in every direction than is normal in panel-beating. The exact degree of forcing of the metal which is permissible depends upon the particular alloy being worked, its temper, and

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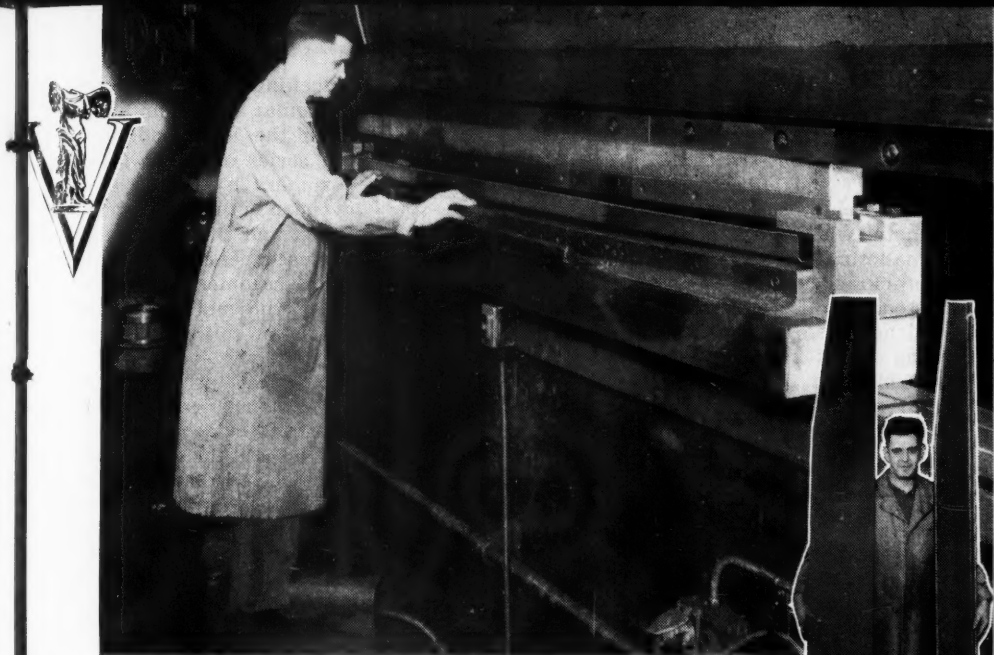
upon the ability of the craftsman.

An experienced panel-beater uses the beating method suitable to the job in hand, complex shapes often being beaten up by using both hollowing and puckering methods. For light-gauge material, too much hollowing or blocking is not to be recommended, as it tends unduly to thin the metal, and as puckering can be carried out very successfully in aluminum alloy sheet the latter method is definitely the better to use during most of the shaping process.

The skilled panel-beater is a craftsman who, to a great extent, relies on a good eye for line and form; this can only be cultivated by years of experience, which, combined with dexterity in the use of hand tools, is the secret of his craftsmanship. Wood formers, upon which the beaten shape can be "offered up" in order to obtain uniformity in shape for each workpiece, are used for many jobs. The shape of the job is retained in the vision of the panel-beater, who can, by beating on the sandbag and puckering over a suitable head, obtain a very good approximation to the desired form. This requires hammering lightly on the wood former to obtain the finished shape. Until the metal covers the former snugly it is often necessary to ease, by a little extra hollowing, any spots where the metal prematurely touches and holds off the workpiece from fitting correctly.

Instead of using formers, many panel-beaters are often content with the use of templates only, which are cut to the shape of the various cross-sections of the workpiece. These templates are used during final stages of the beating process to check the finished shape of the job. After shaping, the surface of the finished article has to be smoothed on a steel head by means of light hammering or, if the part is of fairly large dimensions, on a wheeling (rolling) machine.

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DRAWING

ANOTHER JOB OCCASIONALLY DONE ON CINCINNATI PRESS BRAKES

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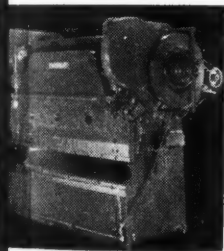
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This Press Brake brought low cost and clean-cut production in the manufacturing of these trailer frames.

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SHAPERS • SHEARS • BRAKES

During the beating process aluminum sheet hardens, and it becomes necessary at intervals to anneal the metal by heat-treatment in order to regain malleability. An excessive number of blows should not be given to the metal when shaping up, as too much malleting in one place may cause cracking. It must be clearly understood in all panel-beating work that, although this is essentially a hammering operation, an unnecessary number of blows is to be deplored, as they can do more harm than good and each blow should be placed where it can give the maximum effect.

Hollowing and Raising Methods. It may be useful at this point to follow through the production of various shapes, taking as a first example beating by both hollowing and raising methods one of the most simple double curvature forms, that of a bowl of hemispherical shape. The method of

hollowing or blocking a bowl is shown in Fig. 5. The circular aluminum blank is held tilted in the left hand on a sandbag and a series of blows given around its periphery by means of a pear-shaped wooden mallet, though for sheet of 18 s.w.g. and thinner it may be preferable to use a pear-shaped rubber mallet. This hammering has the effect of sinking the metal into the sandbag, which is, of course, resilient to the blow.

After each blow the disc is turned and the next blow struck near the edge of the metal. In this way a series of "dents" is made around the circumference of the disc. The tendency will be for wrinkles to appear on the edge of the metal, and these must be gently malleted out to avoid overlapping and cracking. The hammering of each course has to be done methodically, with a steady series of blows, in order to bring up a regular shape.

On completion of the first course of

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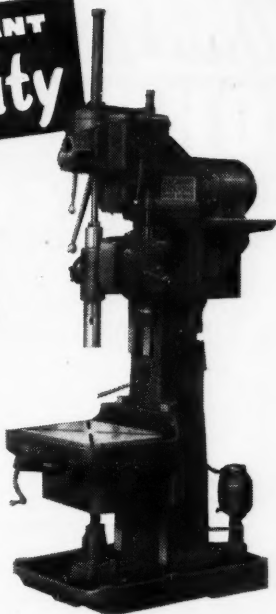
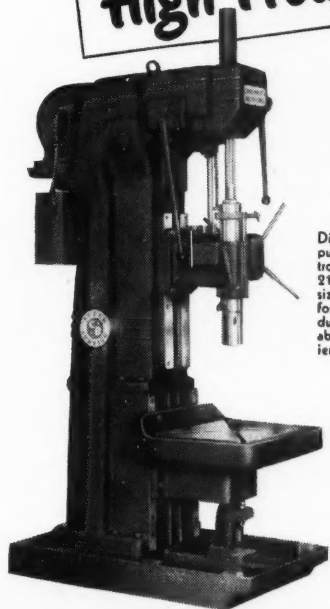


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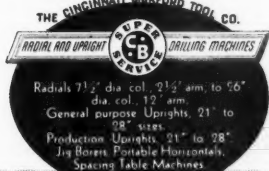


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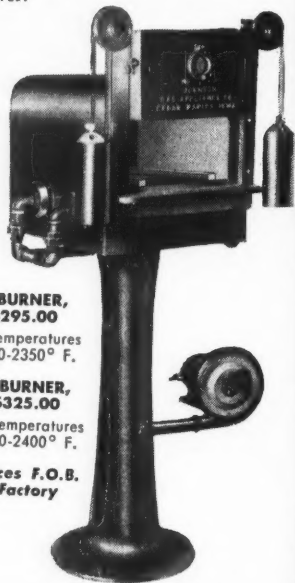
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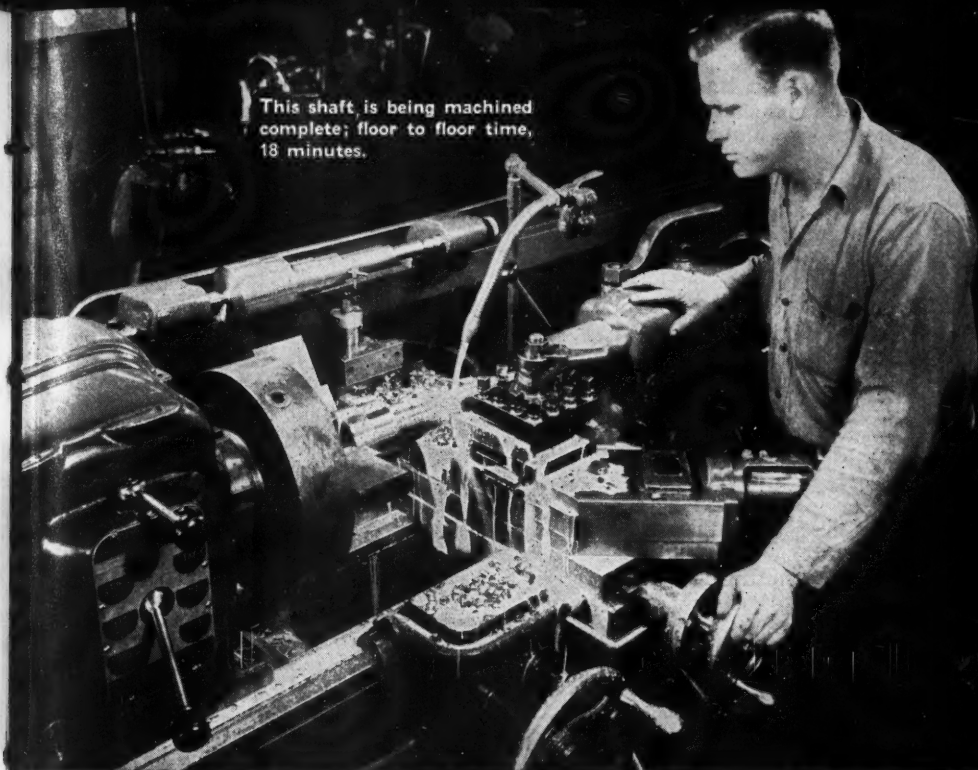
JOHNSON GAS APPLIANCE CO.

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blows a second course is begun further in from the edge. This process is continued until eventually the center of the disc is reached. By this time the disc will have taken a double curvature form, but should greater depth be required the whole operation must be started again, working from the edge of the disc gradually towards the middle of the job, until the bowl is completed to the desired shape and size. It may be necessary during the beating process to anneal the workpiece to restore its malleability, because the hammering tends to harden the metal. Instead of using a sandbag it is sometimes the practice to beat the material into a hollowed-out recess that has been "sunk" in a wood block.

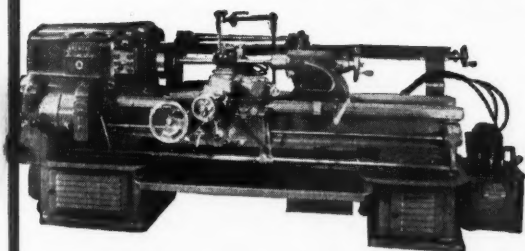
The second method — raising — is carried out by drawing the metal in courses over a suitably shaped steel or wood head. A series of "dents" is made in the metal since each blow is a floating one, the metal being struck lightly off the head, as shown in Fig. 6. The disc is rotated after each blow, as in hollowing. The raising process does not thin the metal at all; on the contrary, as the edges wrinkle up the metal thickens, because obviously the circumference of the bowl is much less than that of the flat disc. When the bowl is partially beaten over the head, a series of puckers can be made in order to quicken the beating process by "taking in" surplus metal. A pucker is made at any point on the edge of the disc by bending the metal on a stake into an ear-shaped form. After the tuck is formed, the disc is placed on a steel head and each side of the tuck lightly malleted to stiffen the metal and hold the pucker in position. Then, working from the base or apex of the tuck, the surplus metal is malleted out towards the edge of the disc. This has to be done carefully, with a minimum of blows, and overlapping (with consequent cracking at the edges) must not take place. As each pucker is formed

This shaft is being machined complete; floor to floor time, 18 minutes.



SHAFT PRODUCTION COSTS

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The new "American" "H S-D" (Hydraulic Shaft-Duplicating) Lathe presents to the metal-working industry a new and revolutionary technique for the production of various types of shafts. Other methods are now outmoded by this new development. Production costs have hit a new low. Piston rods that formerly took over 4 hours are now produced on this lathe in 36 minutes.

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and worked out the bowl deepens towards its final shape.

Puckering can be used to shape the bowl completely without using the raising method. Suitable puckers are made around the edge of the disc, and the surplus metal driven towards the middle of the bowl by means of floating blows over a wood head, which process gives the fullness required for the double curvature form.

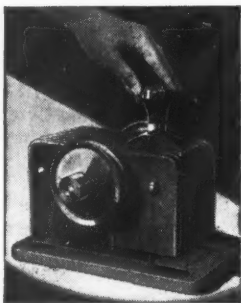
In beating double curvature forms in heat-treatable alloys it is advisable to work as near as possible to the finished shape, while the metal is in the annealed condition. When the workpiece is solution heat-treated and quenched, any distortion may be corrected in the short space of time available before age-hardening sets in. Provided their nature is fully understood and allowed for, most of the heat-treatable alloys can be beaten as readily as non-heat-treatable alloys.

Planishing. Planishing is the finish-

ing process by which the workpiece is smoothed off and set into its correct shape. It may be done with a flat steel hammer, with the wheel, or with a combination of both. It is best carried out with a large number of light blows, and for this reason a power operated hammer giving blows at a rapid rate is often used. Where hammers are employed, the process is carried out over a convex head of iron. The planishing is performed over the whole surface of the workpiece, the blows being light and given squarely, otherwise they will produce crescent marks which may be difficult to eradicate. Each hammer blow produces a flat spot, and the blows are so directed that the spots merge imperceptibly into one another over the whole surface. Any low places or "valleys" on the surface of the workpiece can be eliminated by careful hammering on the head, which slightly stretches the metal and shapes it to the correct contours.

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SELECT-O-SPEED speeds up to 10 to 1 ratio, from fractional to 7½ h.p. Lever, hand wheel, or electric motorized control.



LOVEJOY Variable Speed Controls

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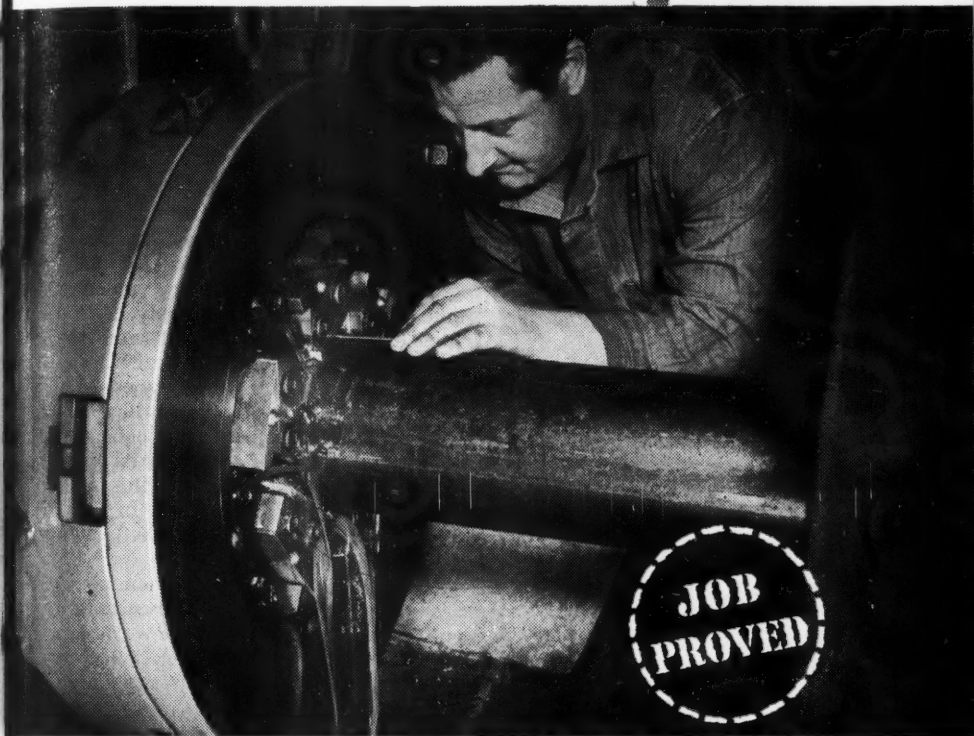
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Here is a case where a big manufacturer of automatic fire-sprinkler systems increased production and improved his threads by replacing a special, expensive oil with Sunicut 196. A saving of 15% in oil costs resulted.

Machine: No. 5 Landis Pipe-Threading Machine.

Operation: Threading $\frac{3}{8}$ " to 8" Pipe.

Lubricant: Sunicut 196.

Machine-tool operators prefer Sunicut because it is a clear, transparent, free-flowing, sulphurized mineral oil. Sunicut is recommended for those exacting jobs where an emulsifiable cutting oil is not suitable. Contact the nearest Sun office for recommendations.

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Raises, lowers, transports. Three table surfaces. Accessible from four sides. Four point support. Standard model capacities, 1,000 to 5,000 pounds. Special models built on order.

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Both the hammer face and the convex head must be kept scrupulously clean and perfectly smooth, otherwise it will be impossible to avoid marking the sheet. Planishing should leave the metal with a dead smooth surface. If this is not attained, small hammer marks can be removed by smoothing off with emery cloth glued to a piece of wood and used like a file.

Wheeling. Some craftsmen planish only with a wheel, though to obtain a good finish it is best used after planishing with the hammer. The wheeling machine itself consists simply of two wheels, one practically flat and the other convex, meeting at a common center. The lower, convex, wheel is a free wheel of 2 in. or 3 in. in diameter on a spindle carried by a vertical arm which can be raised or lowered by a screw movement to regulate the pressure. The upper, flat, wheel, of 6 in. to 8 in. in diameter, is carried on a horizontal shaft.

Care should be taken, when using the wheel for aluminum alloys, not to put too much pressure on the work. Up to three times as much "lift" is obtainable with the aluminum alloys as with steel, and much more shaping by wheeling is possible in the case of aluminum than with harder metals. It may be used simply to produce a smooth surface by the friction and rolling action derived from passing the sheet backwards and forwards between wheels of a shaped periphery.

Where parts of moderate curvature are to be produced by wheeling alone, the sheet to be shaped is placed between the two wheels at one edge or in the middle, and pressure of an intensity appropriate to the temper and gauge of the alloy is applied. The sheet is moved backwards and forwards through the wheels, each line of wheeling partially covering the next one, and by the repetition of the movement both longitudinally and transversely the metal stretches and so takes on a con-

"Dalbo" AIRLINE COUPLINGS and FITTINGS



Quick Acting

PIPE ENDS

Machined from solid bar steel and brass; steel is thoroughly rust proofed. Quick-lock sleeve. Male threads in six sizes: from $\frac{1}{4}$ " to $1\frac{1}{4}$ "



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Quick locking sleeves prevent accidental uncoupling. Grooved with four serrations on shank for standard hose clamps. Made in six sizes.

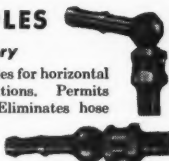


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SWIVEL NIPPLES

New Airhose Accessory

Straight and angle type nipples for horizontal or vertical working operations. Permits quick changing of tools. Eliminates hose kink. Increases efficiency.



Quick Acting



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Quick-lock sleeve, will not accidentally uncouple. Requires a quarter-turn to lock or unlock. Female threads made in six sizes: from $\frac{1}{4}$ " to $1\frac{1}{4}$ "

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Made for Hose Size $\frac{1}{2}$ " and $\frac{3}{4}$ "

AIR VALVES

Pressure seated air valve with male thread at one end, grooved hose shank at other. Provides a convenient shut-off valve within operator's reach.

AIR VALVES

Angle permits hose line to fall away from valve and eliminates kinking. Valve has only three parts. Trouble-free construction assures long life.



30° Angle—made in 4 sizes

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All of Dallett's Blow Guns are made from brass. The lever valve style is made in two sizes: $\frac{1}{4}$ " and $\frac{3}{8}$ ". Extensively used wherever air is employed.



Lever Style



Button Style

BLOW GUNS

Dallett's shrouded button valve design Blow Gun eliminates possibilities of breaking or bending valve stem. Made from brass in $\frac{1}{4}$ " and $\frac{3}{8}$ " sizes.

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DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

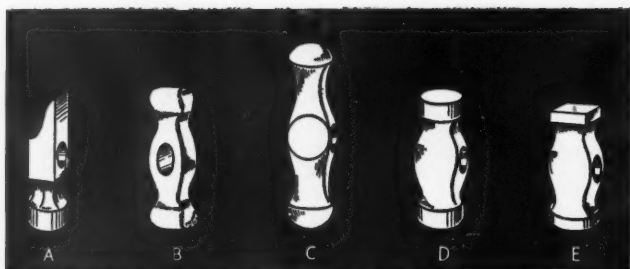


Fig. 7 — Illustration Showing Various Hammer Shapes Used in Panel-Beating. A —Stretching, Riveting and General Work; B—Stretching, Flanging; C—Blocking and Hollowing; D — Planishing; E—Planishing and Double Curvature Work.

vex curvature. Movement of the sheet is varied until the desired shape is obtained. Those parts of the metal which are required to be of slight curvature should be subjected to less wheeling than the other more curved positions.

Tools for Panel-Beating. Owing to the relative softness of aluminum and its alloys, all tools must be kept scrupulously clean and free from hammer or file marks. Corners and working edges of appliances such as anvils, beck irons, crease irons, mandrels, hat-

chet and other stakes must be well rounded to a definite radius to avoid any possibility of the metal being cut when placed upon them. Hammers and mallets should always be cleaned after use, the former by rubbing over with a leather polishing pad treated with knife-powder, the latter with very fine sandpaper as soon as marks are in evidence.

For use on aluminum, mallets, which are round - headed or pear - shaped, should be made of carefully chosen

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STANDARD *Adjustable* MULTIPLE SPINDLE
DRILL HEADS

Low Prices • Top Quality • These Heads can be adapted on either round or flanged quill machines.

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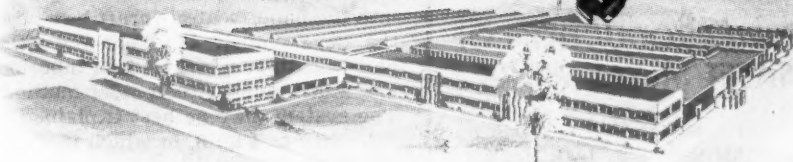
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National Counterbores are available with or without pilots, and with taper shank or straight shank holders. National End Mills are available in a wide variety of sizes and types, including both double and single end.



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New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

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wood. Boxwood is often used, but holly is better, since it is more resilient. Apple and pearwood are suitable for dressers and similar tools. Many craftsmen use mallets made of plastic, fiber, rubber and other substances; while these are useful they are apt to pick up grit and thus mark the workpiece.

For the panel-beater, hammers are precision instruments, and they should therefore be chosen with great care. The hammers used are lighter in weight than those commonly used for hammering harder metals. Fig. 7 shows drawings of several hammer shapes which can be used in panel-beating.

In recent years it had become almost standard practice to use a steel spoon or dresser for work on aluminum sheet. Such tools are easier for the beginner to master than is the hammer but many craftsmen claim that for the highest quality work the old-fashioned hand-forged hammer is still best.

"Split-and-Weld" System of Panel-Beating. The introduction of welding into the panel-beater's craft has led to the development of "split-and-weld" panel-beating, which is less laborious and much quicker than older methods. The system may be best explained by reference to Fig. 8, in which is shown the method of making a pattern on a panel jig with brown paper. The paper is held off the jig by tension at its edge. To allow the paper to drop on to the jig, the paper is slit at suitable points, the edges then opening out to let the pattern fall into position. It is obvious then, that additional material is required at the slits. This may be obtained in the panel either by stretching the metal at these points until enough is obtained to meet the requirements or by welding in V shaped pieces of metal.

Another application of "split-and-weld" work can be used in the manufacture of the bowl earlier described.

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Winter Commercial Double-Fluted Taps are typical of Winter dependability. They are heat-treated after hardening by an induction heat process, and will work freely even on tough materials.



The design of Winter taps is based on two elements: laboratory testing and field testing. In the field, Winter taps are tested under actual production conditions. Reports of these tests are forwarded to the Winter laboratories. Here the information gained in the field is used to guide experiments in the development of better cutting tools. That is why when you specify Winter Taps you get taps which incorporate the latest advancements in metal cutting.

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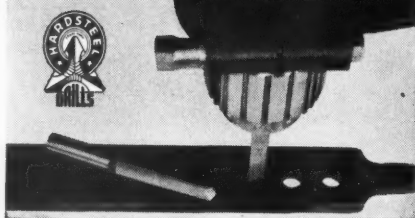


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Drill Hardened Steels without Annealing with "HARDSTEEL"



Don't let anyone tell you that hardened steels must be annealed before drilling, countersinking, counterboring or reaming.

With "HARDSTEEL" drills you can produce accurate, smooth holes in steels hardened by any process—oil-hardened, water hardened, cyanided, nitrided, and they work equally well on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" drills used with standard drill presses cut costs in production shops because parts drilled after hardening always match at assembly. In service shops they save time and material and permit engineering changes calling for additional drilling to be made after parts are full hardened.

Write for a copy of the "HARD-STEEL" Operators Manual showing how "HARDSTEEL" drills are now functioning in thousands of plants in parts recovery operations.

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**"HARDSTEEL" Tool bits make
faster, deeper cuts on steels
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1372 East 222nd Street • Cleveland 17, Ohio

"HARDSTEEL"
DRILLS • TOOL BITS • SPECIALS

This can be made much more simply by cutting a number of V pieces of the periphery of the blank, and then roughly shaping the workpiece to enable the edges of the V's to meet and be welded together. The shape can then be completed by further beating and planishing, as required.

Typical Examples of Panel-Beating. Typical examples of the panel-beater's craft as applied to aircraft duct-work are illustrated in Fig. 9. At A is shown a pipe bend made from aluminum alloy; it is formed of two cheeks shaped, planished, and welded together. This simple double curvature form is

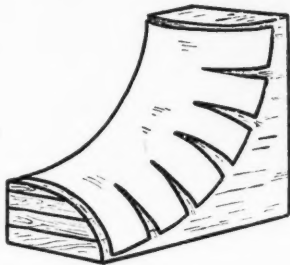


Fig. 8—Drawing Showing Layout of "Split-and-Weld" Pattern

made in the following manner:

The throat of one half of the bend is worked to shape as at B by malleting a course of blows over a head, starting from near the edge and working towards the center or neutral portion of the bend. The reason for working the throat first is to stiffen and hold the workpiece while shaping the back of the bend; also, should any small cracks occur at the edges through undue stretching they can easily be trimmed off with the snips, and the burr filed off. The back portion of the cheek is brought up by a series of puckers as at C, the surplus metal being driven by floating blows towards the middle of the bend. After hand planishing, the cheeks are cut to size, and the seams welded together and planished. The

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No Idle Gesture

When operators vote "THUMBS UP" for Cimcool, they really mean it. And no wonder! For this new kind of cutting fluid is better seven ways, from the worker's point of view.

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2. Can't smoke or burn—causes no harmful vapors.
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OF ALL METAL WORKING JOBS

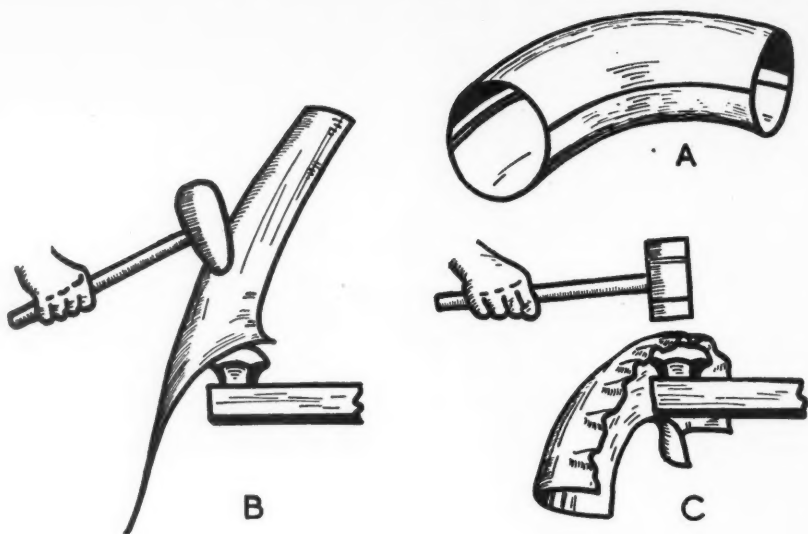


Fig. 9—Drawing Illustrating Technique Employed in Beating a Pipe Bend

cross-section of the bend may be made to the correct shape and size by the use of internal or external templates.

The use of air-operated drop hammers to form aluminum and aluminum alloy pressings has enormously increased the output of this class of work. It is often the practice to anneal aluminum before pressing, which con-

sequently means that the resulting pressings are too soft. To overcome this, and to stiffen up the metal, they may need to be stiffened by cold-working by running through rolls, particularly for some types of aircraft work, where the pressings have to be slightly reshaped before they can be used on the assembly jigs.

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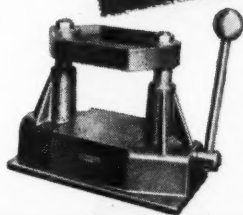
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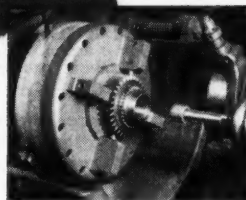


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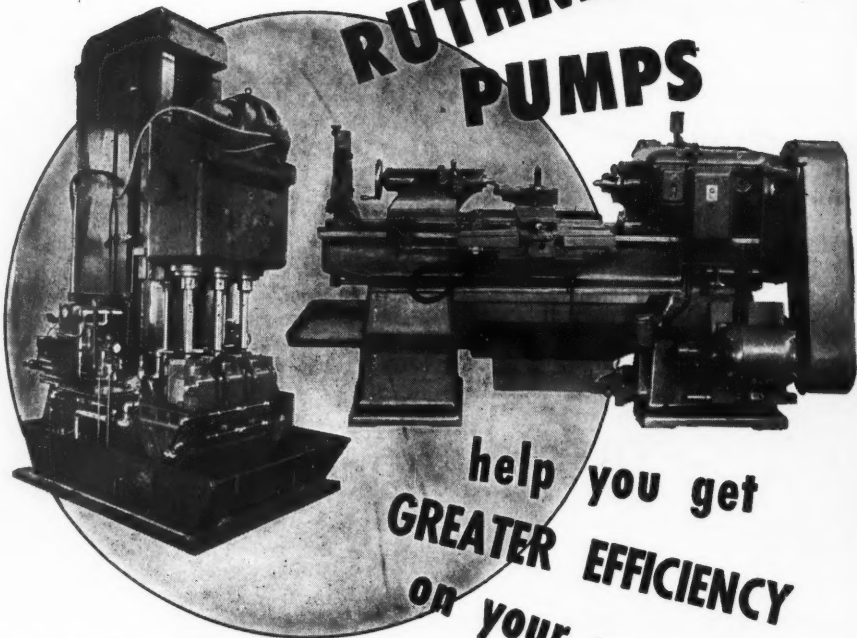
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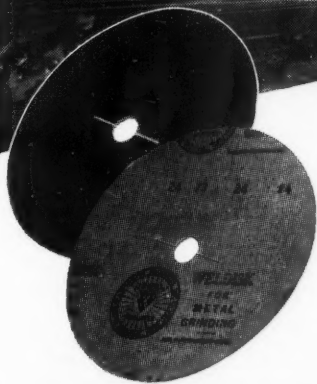
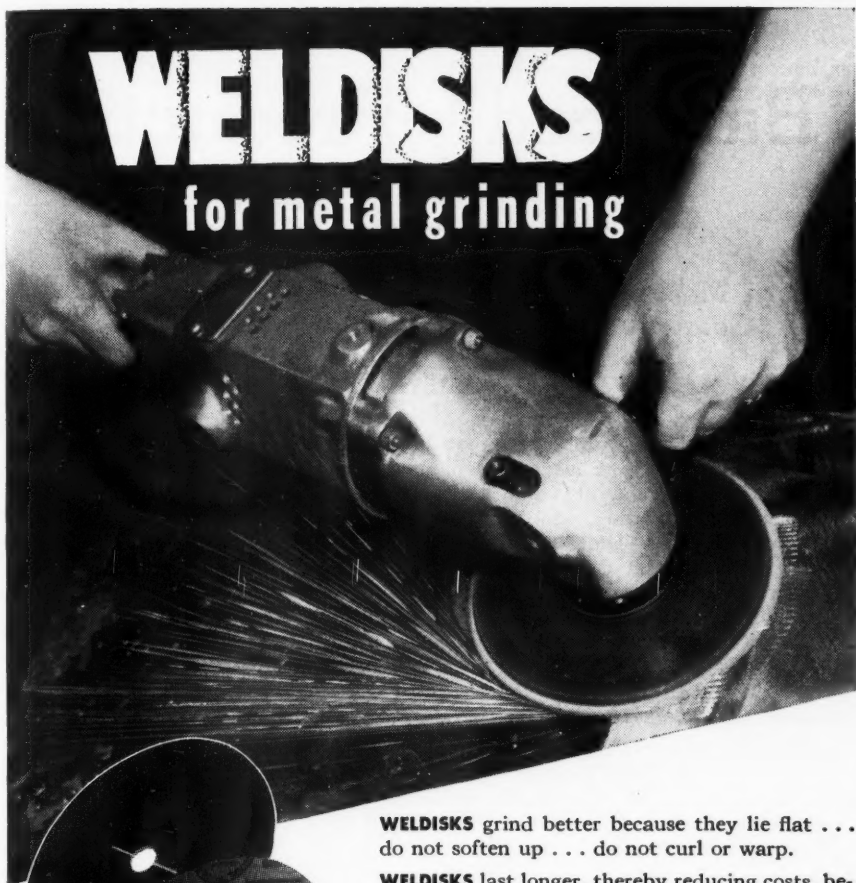
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"Balanced" Production at Detroit Gear

Modern Machining Methods Enable Truck Transmission Gear Manufacturer to Increase Production

By BARTLETT WEST

EMPLOYING three different gear cutting methods — Shear - Speed, hobbing and gear shaping—and two different gear finishing methods — rack and underpass—Detroit Gear Division of Borg-Warner Corporation effectively has balanced its production on all the gears which go into the manufacture of the transmission for a popular make of 1½-ton truck.

In addition, of the 13 gears and corresponding splines in this transmission, seven gears are finished by the use of only five rack-type machines and without requiring any changeover in tooling. The three shoulder gears are all finished on Michigan Underpass-type machines; the three splines do not require shaving. The two larger of the three shoulder gears are cut on

GEAR	NO. OF TEETH	PITCH	CUTTING METHOD	CUTTING TOOLS	
				No. of Hob Threads	Type
Countershaft Cluster	43	7	Hob	2	Pre-Shave ¹
	36	7	Hob	2	Pre-Shave ¹
	27	7	S—S*	—	Form
	17	7/9	Hob	2	Pre-Shave ¹
Low and Second Sliding Gear	43	7/9	Hob	2	Pre-Shave ¹
	33	7	S—S*	—	Form
High and Third Speed	24	7	Hob	2	Pre-Shave ¹
Reverse Idler	22	7/9	Hob	2	Pre-Shave ¹
	18	7/9	Shaper	—	Pre-Shave ¹
Drive Gear	17	7	Hob	2	Pre-Shave ¹
	10	Spline	Hob	1	Plain
	10	Spline	Hob	1	Plain
	6	Spline	Hob	1	Topping

¹ Rack Shaved in tandem with 22 tooth idler gear.

² Rack Shaved in tandem with 24 tooth H.S. gear.

Fig. 1—Table illustrating plan developed to balance production.

two of the new and extremely fast Michigan Shear-Speed machines, while the smaller gear is cut on a gear shaper which is one of a battery of six.

The manner in which the objective of balancing the production has been achieved is illustrated in the table Fig. 1. The hobbers indicated are all 8-spindle Clevelands, equipped with double-thread Michigan Class B "pre-shave" hobs. The use of double-thread hobs is intended to reduce production time.

Michigan pre-shave cutters are also used on the Fellows Gear Shapers with which the 18-tooth gears on the reverse idler clusters are produced. Splines are cut with single-thread hobs, the hob for the long six-spline shaft also being designed for "topping." All tools, including those on the Shear-Speed machines, are form ground, in accordance with the Company's standard practice. To further balance production between the 8-spindle hobbers and the single-spindle Shear-Speed machines, the 22-tooth gears on the reverse idler of the 24-

tooth high-speed gears are hobbled in pairs, two at a time, back to back, on alternate spindles of one hobber.

Two 17-tooth gears—one on a cluster and the other a drive gear—are cut on alternate spindles on a single Cleveland machine as shown in Fig. 2. This machine, of course, operates on a shorter cutting cycle than is required for the larger gears. To minimize scallops and to produce a smooth fillet, a four-inch hob is used to cut the 17-tooth drive gear and 22-tooth reverse idler gear. All other hobs used on this machine are of three-inch diameter.

It should be noted that all of the gears cut with the double-thread hobs on the Cleveland machines go to the Michigan rack-type shaving machines for finishing, whereas the gears cut on either the Shear-Speed or the shaper cutters are finished on Michigan Under-pass-type rotary finishers. An interesting setup is utilized on two of the rack shavers by which two gears of different sizes are finished at the same time, the gears being mounted

NO. OF SPINDLES TO BALANCE SHEAR-SPEED PRODUCTION	FINISHING METHOD	SHAVE TIME (Mins.) FLOOR TO FLOOR
8	Rack	1.0
8	Rack	.92
1	Underpass	.62
4	Rack ²	(1)
8	Rack	1.0
1	Underpass	.73
4 ⁴	Rack	1.088
4 ⁴	Rack	.936
6	Underpass	.6
4	Rack ²	(2)
4	—	—
4	—	—
8	—	—

² Michigan pre-shave type cutters.

⁴ Two Gears hobbled at one time, each arbor.

⁵ S.S.—Michigan Shear-Speed.

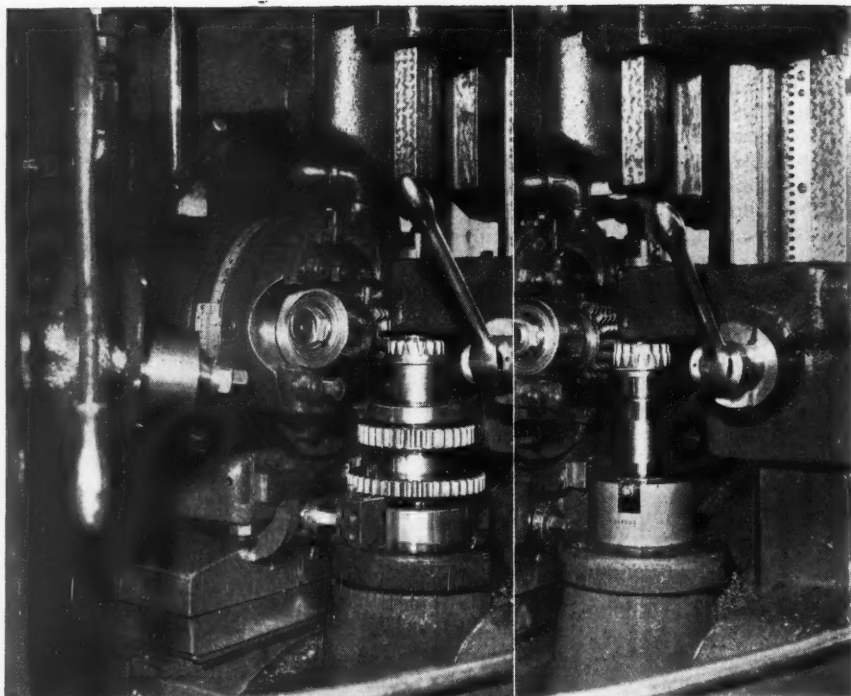


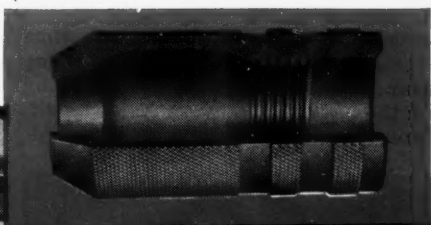
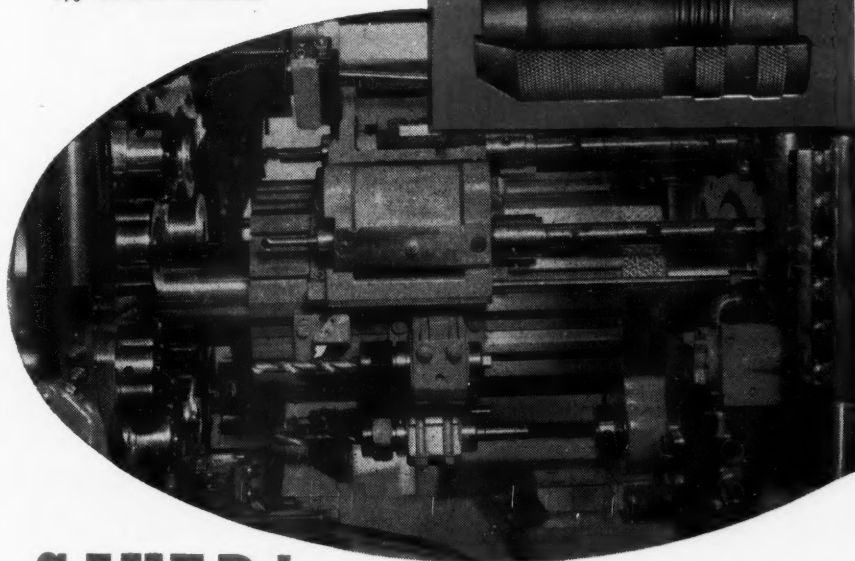
Fig. 2 (Above) — The 17-tooth gear on the cluster and 17-tooth gear on the drive gear are cut on alternating spindles on this hobber, both with double-thread Michigan-ground form hobs. Fig. 3 (Left) — Shear-Speed cuts the 27 teeth on the step-gear on this cluster in a machine cycle time of 48 seconds. Note the automatic clamping fixture.



in tandem on the machines.

The time required for finishing, floor to floor, is somewhat less on the "Under-pass" machines than on the rack machines. In this regard, however, it must be remembered that the gears finished on the rack machines are cut

14 OPERATIONS—A SINGLE SETUP Machining time is 23 seconds on this chuck hood, turned from X1112 bar stock. Size: $1\frac{3}{8}$ " dia. x $2\frac{3}{4}$ " long. Machine: Acme-Gridley $1\frac{3}{8}$ " RB-8 Bar Automatic.



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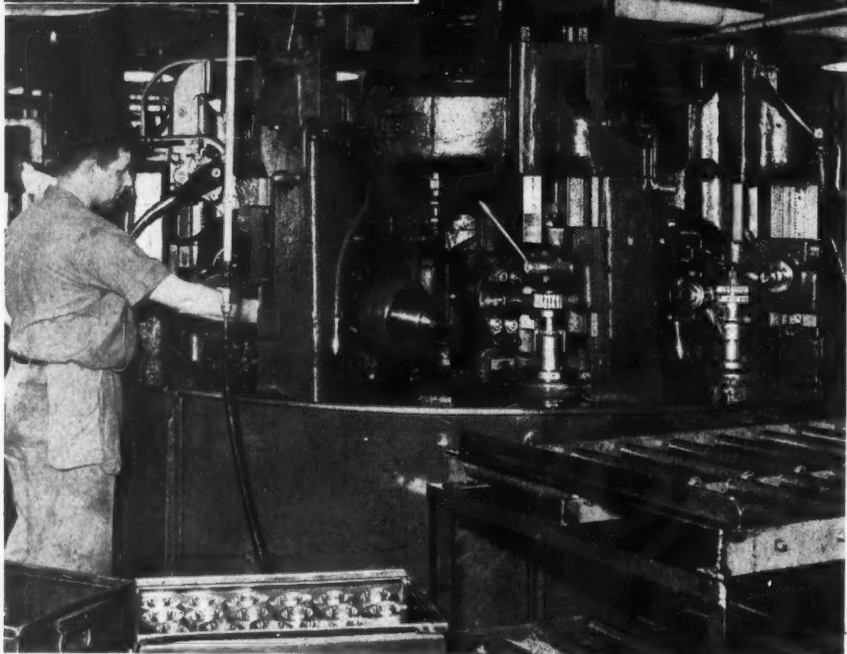
with double-thread hobs and thus would normally require more finishing than the more accurate gears coming off the Shear-Speed machines. The difference in finishing time is, of course,

more than made up by the considerable saving in time resulting from the use of the double-thread pre-shave hobs for cutting the gears.

Using this technique, Detroit Gear has achieved an excellent balance of production cycles; using five 8-spindle Clevelandls to match the output of five rack shaving machines, while two Shear-Speed machines feed the work to the two "Underpass" shavers. The



Fig. 4 (Left)—This 36-tooth step-gear is cut just as easily as a spur-gear on the Shear-Speed, using automatic chucking. The machine cycle time is 48 seconds—the same as for the 27-tooth gear on the cluster. Fig. 5 (Below)—The high-speed gear and the 22-tooth gear on the reverse idler gear are cut with Michigan double-thread form-ground hobs on alternating spindles on this Cleveland 8-spindle hobber. The gears are mounted two on an arbor, back to back.



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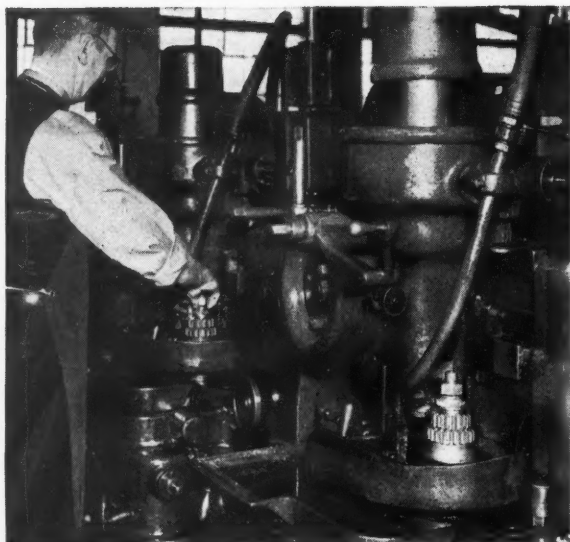


Fig. 6—Half a dozen of these Fellows Gear Shapers are used to cut the 18-tooth step on the reverse idler gear. Form-ground Michigan Tool pre-shave shaper cutters are used.

other Underpass machine finishes the output of the six gear shapers.

The cutting time required for either the 36-tooth or the 27-tooth seven-pitch gears on the Shear-Speed machines is only 48 seconds. This production is largely made possible on the machine for the 27-tooth gear, shown in Fig. 3, by the use of automatic locating and clamping. The illustration shows the machine just before the start of the operation; a finished gear unit is shown on the control box.

The second Shear-Speed machine, Fig. 4, is also designed for

automatic clamping. The clamping arrangement is quite simple. The only movement necessary consists in slipping a U-shaped wedge between the gear and the knob on the machine spindle; when the hydraulic power is applied the gear is clamped effectively.

The Shear-Speed machines are each equipped with a series of single-point ground form tools which cut all teeth of the gear simultaneously by in-feeding in the course of a reciprocating motion of the work. Approximately 350 gears are cut to one sharpening of the cutters. In the sharpening operation some 0.012 inch of stock is removed; thus the blades may be sharpened 60 to 70 times before they are completely worn out.

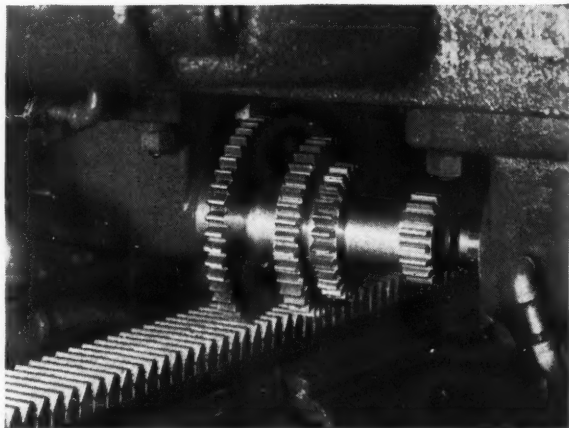
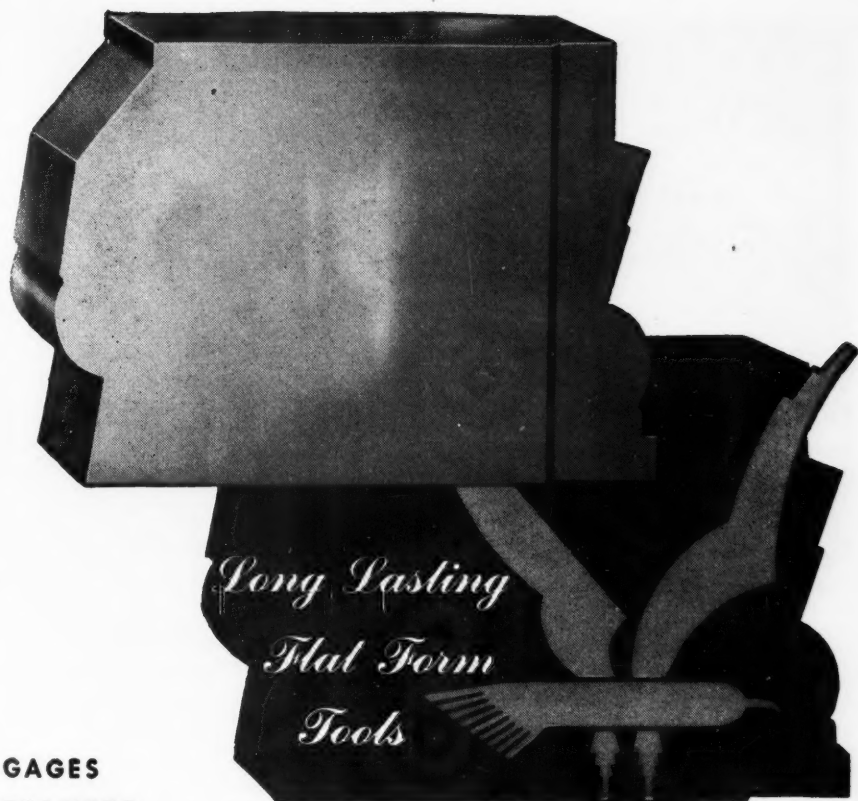


Fig. 7—Shaving the large 43-tooth gear of the cluster on the Michigan rack machine. Chucking is automatic. All gears in the transmission are held within 0.002 inch runout after shaving, when rolled with master gears.

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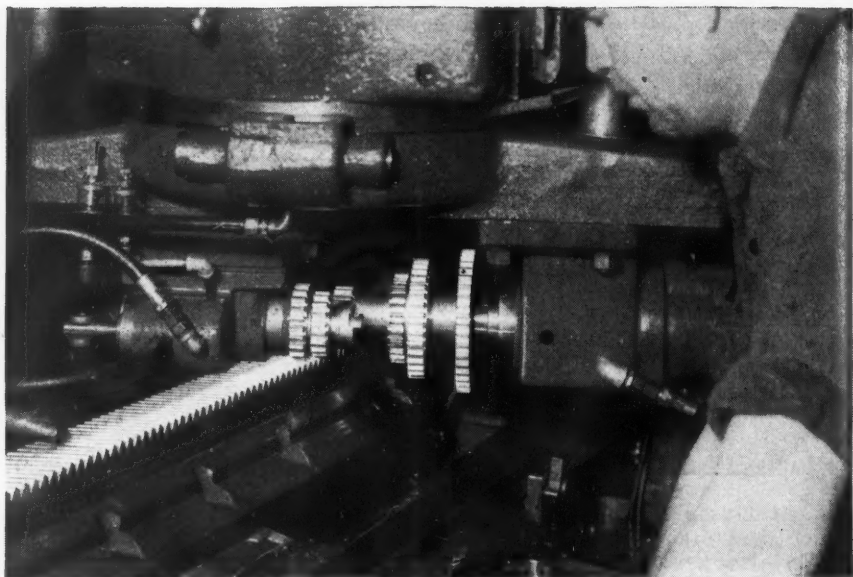


Fig. 8—Tandem shaving two unlike gears on one of the Michigan rack machines at Detroit Gear. The gears are the 17-tooth 7/9-pitch gear on the cluster and the 22-tooth 7/9-pitch gear on the reverse idler.

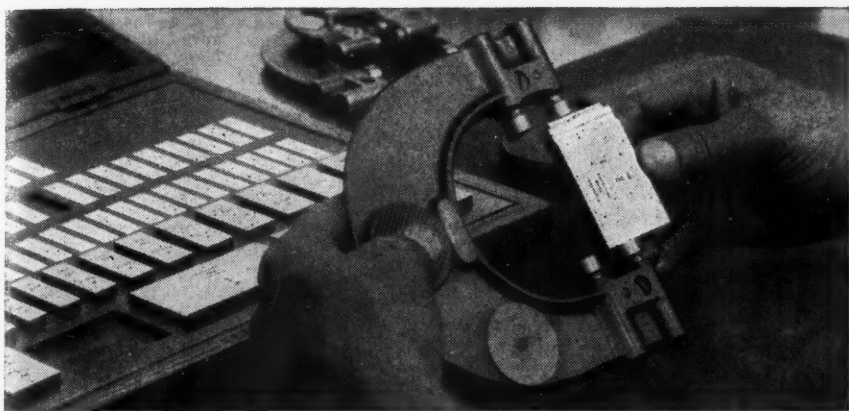
Shown in Fig. 5 is the 8-spindle hobber with which the 22-tooth and 24-tooth gears are produced, two at a time, on alternate spindles. Note that these gears are mounted back to back. A part of the battery of high-speed Fellows Gears Shapers with which the small 18-tooth gears on the reverse idler gears are cut is shown in Fig. 6.

Considering the fact that it is cut with a double-thread hob, the 43-tooth gear on the countershaft cluster is finished in a remarkably short time. The Michigan rack shaver shown in Fig. 7 is used for this operation. The high efficiency of this machine can largely be credited to the provision for fast loading, also to the accuracy with which the machine corrects errors in the spacing and cutting.

Of particular interest is the application of tandem shaving of different sizes of gears at the same time and on

the same machine; it is believed that this is the first time this technique has been used in large-scale production. One of these set-ups, applied to a rack shaver, is shown in Fig. 8, where the machine can be seen finishing the 17-tooth gear on a cluster and a 22-tooth gear on the reverse idler simultaneously. Both gears are 7/9 pitch.

In this setup the gear at the rear is clamped and released automatically, spring clamping with hydraulic release being used for the assembly in front. The clamping on all other rack-type machines is hydraulic. The second rack shaver, on which two gears are cut at the same time, is shown in Fig. 9. Note that no mandrels or arbors are required in order to load these gears into the machine. Both of these gears are seven-pitch, one having 17 teeth and the other 24 teeth. The two machines finish over 200 gears per hour—



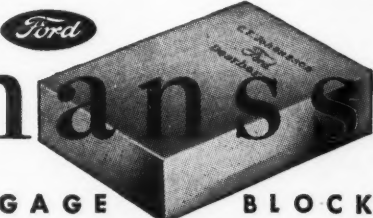
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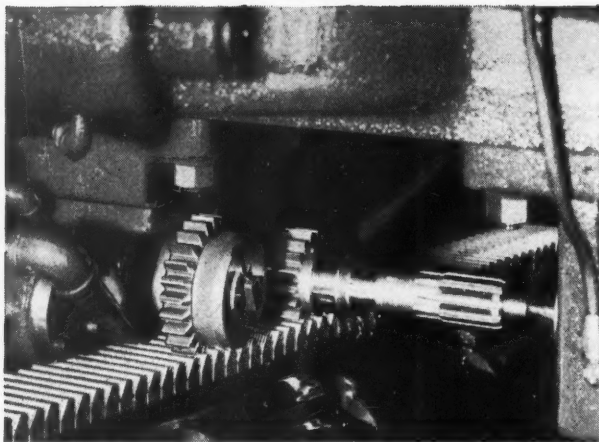


Fig. 9—The 24-tooth high-speed gear and the 17-tooth drive gear, both seven-pitch, are tandem shaved on another one of the Michigan Tool rack shavers at Detroit Gear Division.

an average of $2\frac{1}{3}$ gears per minute.

One of the Underpass shavers, at work, is shown at the left in Fig. 10. The machine is exceedingly fast, averaging less than half a minute for finishing time per piece. It will be noted that the close shoulder on this cluster

does not interfere with the cutting action of the rotary cutter. At the right is a Michigan "900" rack shaver with which a 36-tooth gear on a cluster is shaved.

An interesting feature of the gear-finishing department is the manner in which the machines are arranged so as to reduce lost motion and effort on the part of the operators. Instead of the conventional in-line or staggered arrangement, the machines are posi-

Fig. 10—This operator shaves the 36-tooth gear on the cluster on the Michigan 900 rack shaver, then finishes the 27-tooth step-gear on the same cluster on his Michigan Underpass rotary gear shaver. The gear is mounted between centers in both cases, no arbor being used. Chucking on the rack machine is automatic. Hydraulic clamping is interlocked with the hydraulic operation of the rack machine, so that the rack will not start to reciprocate until the gear is clamped in place.



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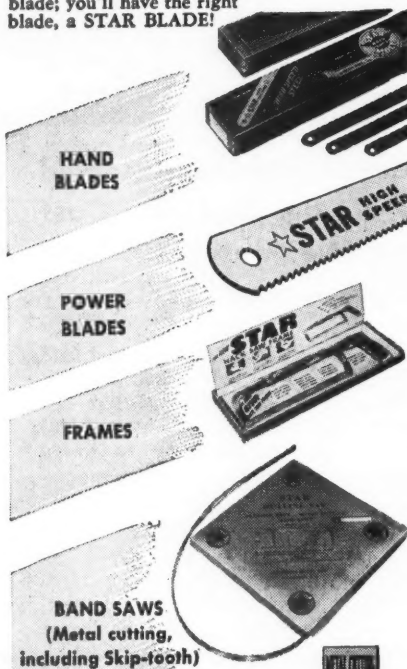


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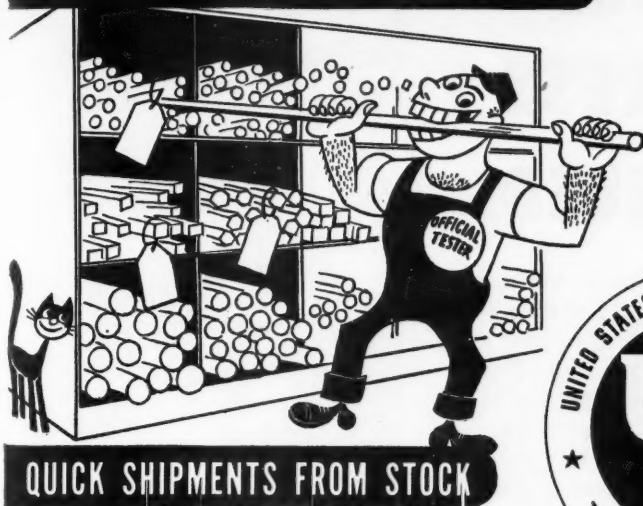
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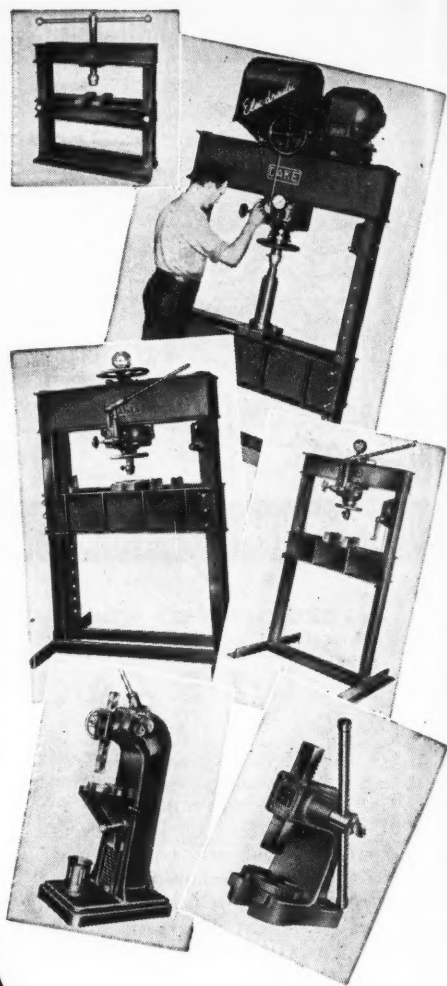
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sion resistance provided by the alloy, it retains the good mechanical properties of the 18-8 stainless steels. General mechanical and physical properties are shown in Table I.

Corrosion Resistance Characteristics

Because of its excellent resistance to the corrosive effects of sulphuric acid, as well as many other substances, Carpenter Stainless No. 20 can be used extensively in the manufacture of heavy chemicals, organic chemicals, synthetic rubber, high octane gasoline, solvents, explosives, plastics and pharmaceuticals. Typical uses include pump shafts and rods, valve stems, tie rods, pipe lines, fittings, screens, and so forth.

The type analysis of the new alloy is as follows:

Carbon07% max.
Manganese75
Silicon	1.00

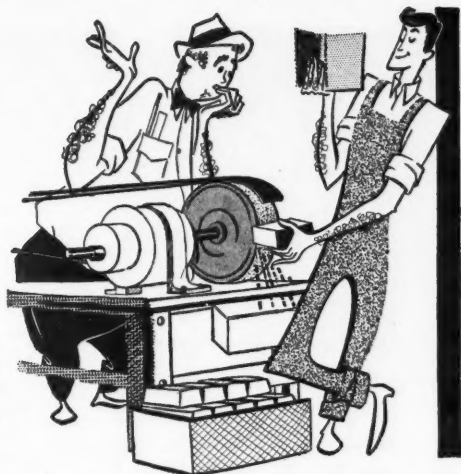
TABLE I

Mechanical Properties (1" round cold finished bar):

Tensile Strength, (p.s.i.)	about 85,000 min.
Yield Strength, (0.2% offset)	about 35,000 min.
Elongation (% in 2")	about 35 to 50%
Reduction of Area	about 50 to 70%
Hardness (Brinell)	about 150-180

Physical Properties:

Specific Gravity	8.02
Weight, lbs. per cu. in.	0.287
Specific Heat	0.12
Melting point, deg. Fahr.	about 2650
Thermal Conductivity cgs units	0.05
Coefficient of Expansion—68°F to 1652°F	10.31×10^{-6}

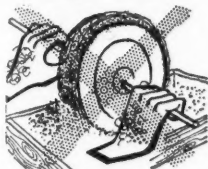


"Look, Hotchkiss! We replaced set-up wheels with Armour belts to increase production, not to help you keep up with the Book of The Month!"

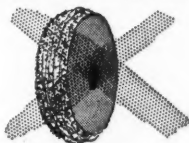
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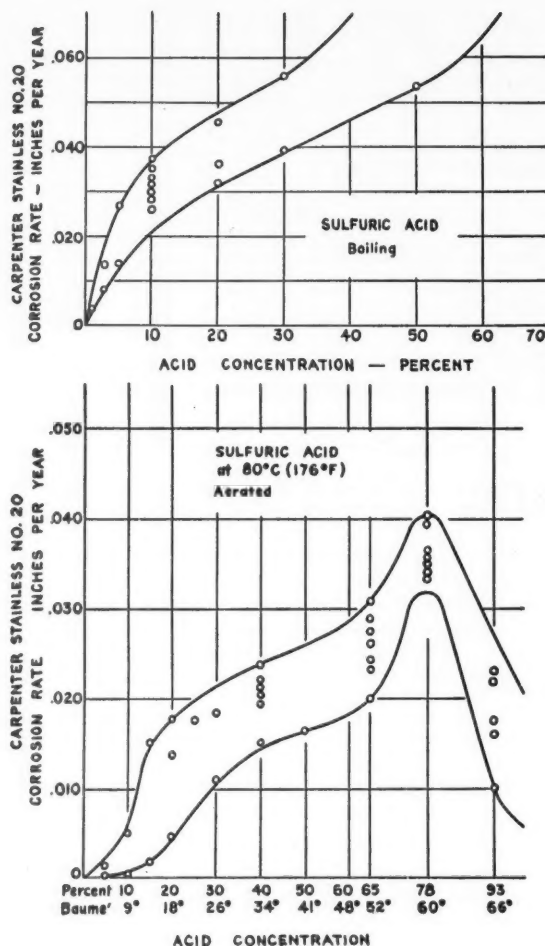


Fig. 1—Chart showing resistance of Carpenter Stainless No. 20 Steel to Concentrations of Sulphuric Acid

Chromium 20.00
 Nickel 29.00
 Molybdenum 2.00 min.
 Copper 3.00 min.

The nickel content of approximately 29%, fortified with high chromium and molybdenum, provides a suitable matrix to place the copper in solid solution, which is of fundamental importance in se-

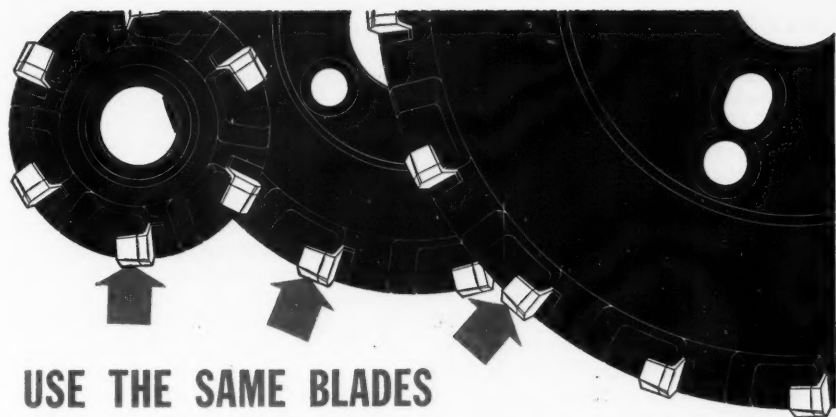
curing unusually good resistance to sulphuric acid. Copper has been found to be essential in securing this resistance and it has been demonstrated that the presence of copper will increase the corrosion resistance by as much as 500 to 1.

The fact that all of the copper is in solid solution, and not present in the alloy as a free element, practically eliminates the possibility of copper contamination. An adequate amount of chromium is present to secure resistance to oxidizing acids, and with the well balanced proportion of nickel, the resulting austenitic matrix has all the mechanical properties of the conventional 18-8 alloy. The molybdenum content of about 2 percent helps to build a more pitting-resistant or "passive" film, and provides greatly increased resistance to sulphuric acid, acetic acid and other chemical reagents. In some cases the 2 percent molybdenum increases sulphuric acid resistance by as much as 100 to 1.

Sulphuric Acid Resistance

The outstanding feature of Carpenter Stainless No. 20 is its excellent resistance to hot sulphuric acid, thus permitting its use in 60 deg. Be. (78%) sulphuric acid solutions at temperatures of about 125 deg. F. Likewise it is satisfactory in 65% and 93% sulphuric acid solutions.

The corrosion resistance (IPY) of the alloy to various concentrations of sulphuric acid at 80 deg. C. (176 deg. F.) and at boiling temperatures is shown in the chart, Fig. 1. Broad "band" curves are



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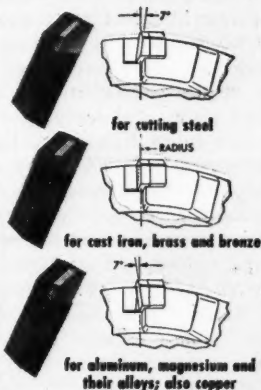
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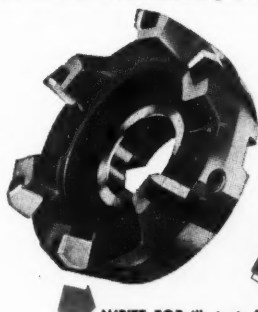
You reduce down-time of your machines by having blades replaced without removing the cutter from the machine. All blades are furnished ready to go to work, and may be re-sharpened individually on a carbide grinder by using a standard checking gage furnished by us. Blades are easily replaced by hand. A standard Allen wrench is the only tool required.

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used to illustrate the variations in laboratory corrosion testing, even though tests are made under identical conditions. An examination of the chart will show that a variety of line curves could be drawn through any set of plotted data with many interpretations of each curve. To eliminate the possibility of confusion all test data are incorporated in a band.

The advantage of using Carpenter Stainless No. 20 to resist the corrosive effects of sulphuric acid at temperatures of 80 deg. C. (176 deg. F.) is graphically demonstrated by this chart. The danger zone, indicated by the "hump," is in the range of 65-69% sulphuric acid at 80 deg. C. (176 deg. F.). In this range the conventional 18-8 Cr-Ni-Mo austenitic steels (Types 316 and 317) show corrosion rates many times greater than illustrated. While Carpenter Stainless No. 20 shows accelerated corrosion, it is far superior to the 18-8 grades and is deemed satisfactory for most of this concentration range.

Each data point represents a 240 hour test. The entire illustration, therefore, represents nearly 10,000 hours of corrosion testing under rigid conditions. Corrosion is accentuated by aeration and agitation, thereby approximating the service which pumps, valves, and most equipment must withstand. The corrosion rates obtained are, therefore, consistently higher than those obtained using quiet, unagitated tests.

The effect of temperature in sulphuric acid corrosion is depicted by direct comparison of the two bands. At the boiling temperature, an increase in acid concen-

was again indicated with the maximum point at the 78% acid concentration. Tests run at 21 deg. C. (70 deg. F.) show no hump in the corrosion curve for Carpenter Stainless No. 20. The corrosion rate is negligible in all concentrations at room temperature.

Sulphuric acid solutions containing contaminants usually have a pronounced effect on the resistance shown by the material. These contaminants may act as inhibitors, accelerators, or may have no effect whatsoever. Inhibitors are generally oxidizing agents such as ferric sulphate, copper sulphate, or nitric acid. The presence of 0.02% (one part in five thousand) ferric sulphate so effectively inhibits the corrosion that losses may be reduced as much as 100 times. Other inhibitors show the same effect, but not necessarily to the same degree.

Carpenter Stainless No. 20 is especially resistant to nitric-sulphuric acid mixtures. The presence of any oxidizing agent will extend the limiting concentrations and temperatures for satisfactory service.

When hydrochloric acid and certain halides are present in sulphuric acid mixtures, the corrosion rates are accelerated. This alloy is extensively used in equipment for sulphuric acid pickling of steel, but the addition of ordinary salt or other chlorides can materially shorten the life of the acid resistant parts.

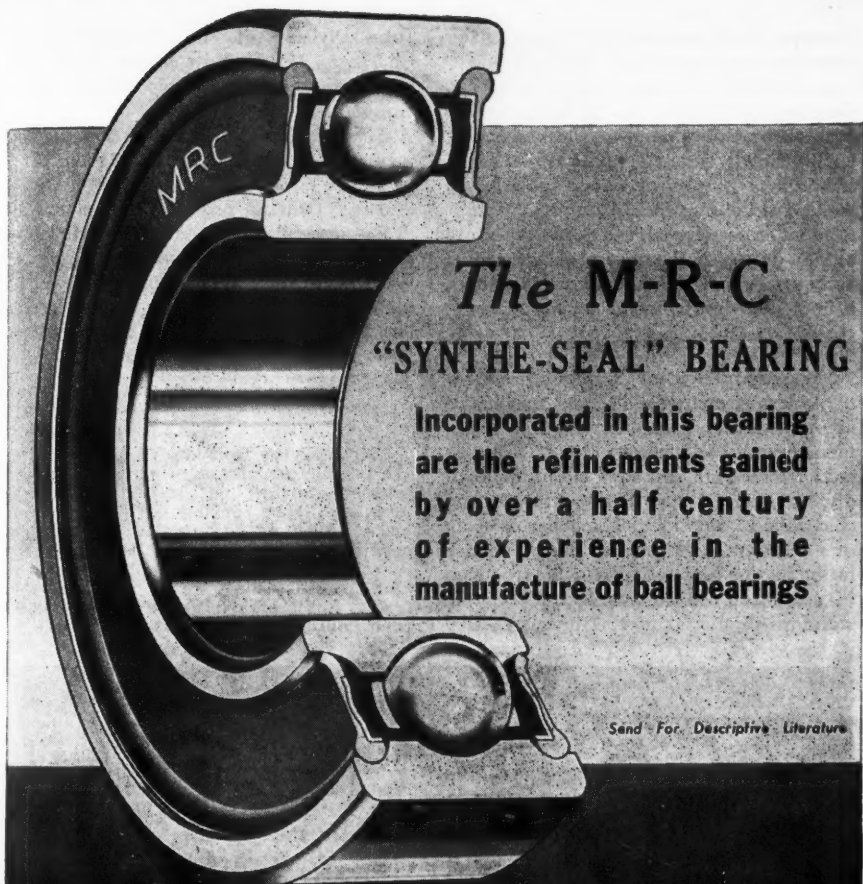
Fabrication and Heat Treatment

A brief tabular description of the working characteristics of the alloy would appear as follows:

Machinability	compares favorably with Type 302 analysis
Hot Forgeability	good, if properly controlled in heating
Welding Properties	good
Formability at room temp.	good

tration results in a rapid increase in the corrosion rate. Again, the "band" is used to enclose the variation of test data. Very high corrosion rates in the order of one inch penetration per year were obtained at concentrations over 50%. The "hump"

In heat treatment, it is important to remember that Carpenter Stainless No. 20, like any other austenitic alloy, cannot be hardened by thermal treatment. Water quenching after heating uniformly to 2100 deg. F. results in maximum corrosion re-



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sistance. Such treatment is given to the material in process of manufacture.

In common with other austenitic alloys, Carpenter Stainless No. 20 is subject to carbide precipitation when heated in (or cooled slowly through) the so-called sensitizing temperature range. Therefore welded structures should be given a subsequent water quench from a temperature of 2100 deg. F. In the case of shot welding, however, where the time element is short, a final heat treatment is not necessary

Forms Available

The Carpenter Steel Company produces centerless ground round bars which are shipped direct from mill stocks. Other forms available include: hot rolled, and cold drawn bars and wire in rounds, rectangles, squares and hexagons; hot and cold rolled strip up to 8 inches in width and 0.010 inch to 0.140 inch thick. The material in the form of tubing is produced in sizes from $\frac{3}{8}$ to 2 $\frac{3}{8}$ inch O.D., and standard pipe sizes up to 2 inch, by Alloy

Tube Division of The Carpenter Steel Company, Union, New Jersey. Weld rod and fittings are available from various manufacturers.

Very satisfactory hot rolled 36x36x0.050 inch minimum thickness sheets have been produced experimentally, and it is hoped that they will be produced commercially in the near future. Experiments with plate manufacture are in progress.

A technical bulletin, providing complete information regarding the new stainless steel is available from the company's Reading, Pa., or Union, N. J. offices.

Polyco Nylon Rod and Strip for use in the production of machined and blanked parts requiring heat resistance, toughness, resilience, or insulating properties are covered as to fabrication, physical properties, and recommended uses in an illustrated folder prepared by The Polymer Corp., Reading, Pa. Copy is available free to individuals addressing requests on their company letterheads.



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Subject: FILES FOR STAINLESS STEEL

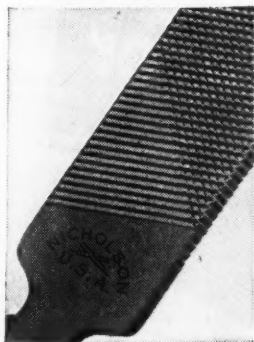
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Filing Stainless Steel

STAINLESS STEEL—A SPECIAL FILING PROBLEM

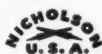
Stainless steels are a group of alloy steels with a very high chromium content. Most common type of stainless steel (known as "18-8") contains approximately 18% chromium and 8% nickel. This makes it tough and dense, and causes an abrasive action that tends rapidly to wear out the teeth or edges of all cutting tools.

SPECIALLY DESIGNED FILE TEETH. While regular purpose files will cut stainless steel, Nicholson has perfected a special type of file tooth which has much longer life than regular file teeth.

HOW TO FILE STAINLESS STEEL. Stainless steels should be filed with a light pressure and a slow, steady stroke to prevent heating the metal — for it becomes harder as it becomes heated. It is also important to "keep the file cutting," otherwise the surface of the metal becomes glazed and more difficult to file.

Nicholson and Black Diamond Files for stainless steel are stamped "For Stainless Steel" and are available through industrial supply houses in same shapes, sizes and cuts as regular purpose files.

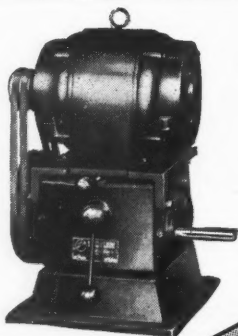
• Nicholson makes special-purpose files for Brass, Lead, Aluminum, Stainless Steel, Foundry Castings, Die Castings, Die Making, Lathe Filing, Curved and Shear Tooth Filing — and Swiss Pattern Files of all shapes and sizes. **FREE BOOK—"FILE PHILOSOPHY."**



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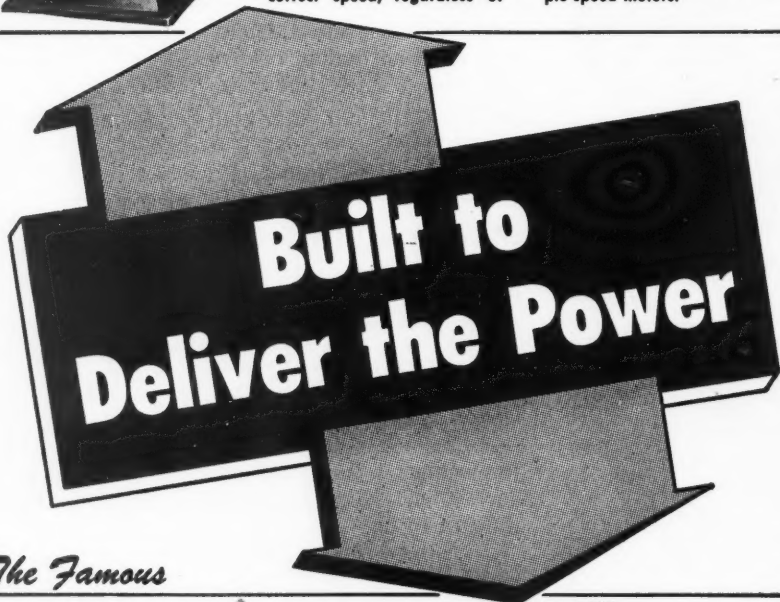
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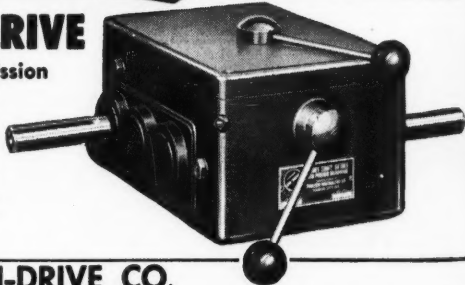


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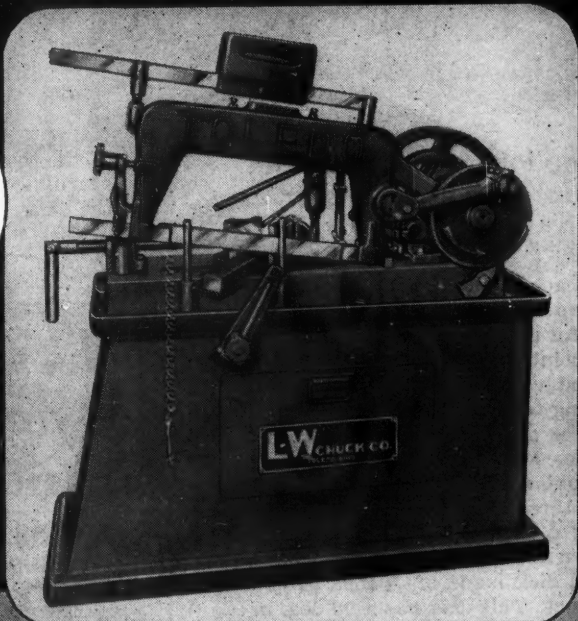
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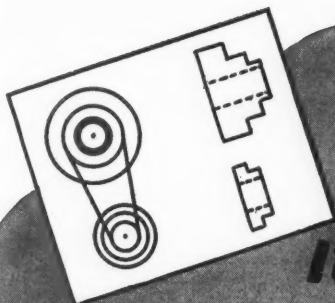
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IDEAS FROM READERS

Device for Checking Single Point Threading Tools

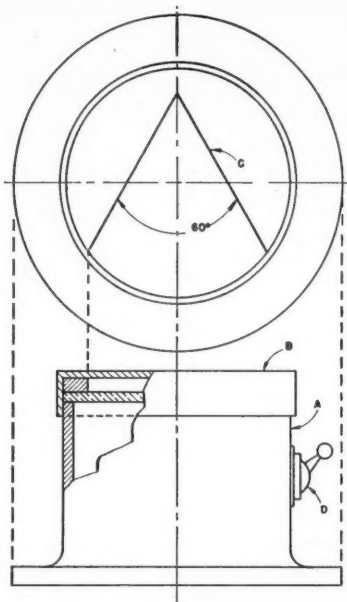
By D. E. McDONALD

THE accompanying illustration shows a drawing of a device designed for use in checking the angle of single point threading tools which will be found very useful in shops where threading tools are ground by hand.

A piece of steel tubing is machined and shaped as shown at **A**. This tube is approximately four inches in diameter by three inches high. The top half of tube **A** is fitted with a steel ring as shown at **B**. Underneath this ring is a round disk made of $\frac{1}{8}$ inch ground gage stock. This disk has a 60 deg. included angle cut into it as shown at **C**. Underneath disk **C** is a piece of glass which has the same diameter as the steel disk. Inside of the tube is a small 25 watt, 110 volt electric light which is turned on and off by means of the toggle switch shown at **D**.

When a single point threading tool has been ground, the accuracy of the angle may be checked as follows: The tool is laid face down on the glass and pushed forward into the 60 deg. angle which has been cut in the steel gage stock. When the tool has come to rest, it is possible to see how accurately it

is ground. If the tool is not ground accurately, it will be possible to see light between the sides of the Vee and the



Device for Checking Single Point Threading Tools

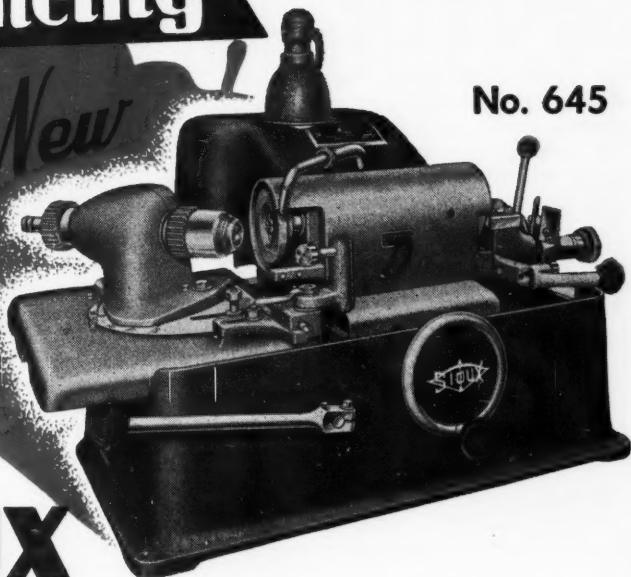
sides of the tool. It is recommended that the glass underneath the steel disk be white to eliminate glare.

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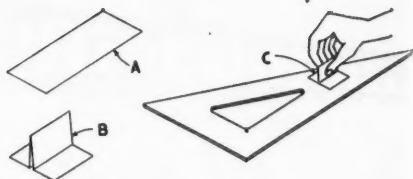
ALERTON & CO., INC.

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Handy Grip for Drafting Instruments

By A. H. WAYCHOFF

A convenient grip for use on drafting instruments such as triangles, French curves, and so on, is shown in the accompanying illustration. To make this handy grip, a small piece of gummed paper tape as shown at A is



Handy Grip for Drafting Instruments

folded double with the coated sides together. The two ends of the tape are then folded outward as shown at B. The tape is then moistened and the sides pressed together. The ends or "feet" are then pressed down on the drafting instrument as shown at C. The grip provides a satisfactory method for lifting or holding the instrument and at the same time can be easily removed without defacing the instrument by merely moistening the grip slightly and pulling off.

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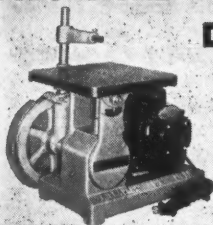
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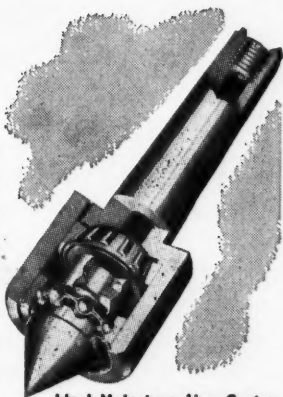
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Dahlstrom TAP GUIDE



Illustration Showing a Method for Handling Cylindrical Work During Welding Operation

chain, the pipe is turned, permitting the welder to work in the flat or down-hand position, thereby increasing the speed of operation and assuring sound welds. The weld is being made with Aircro 78E all-position electrodes.

Adjustable Spindle Stop

By BERT CHARLESWORTH

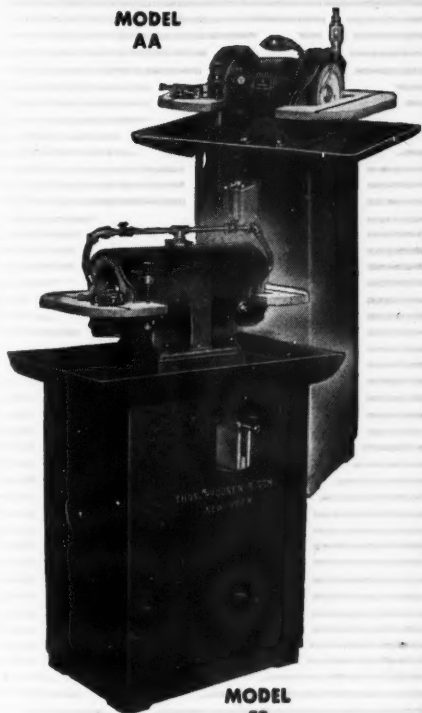
THE tool illustrated in the accompanying drawing is a stop that was designed by the writer for the specific purpose of facing off the ends of shafts to uniform, accurate lengths. The particular shaft shown in the drawing was made for use on a Lodge

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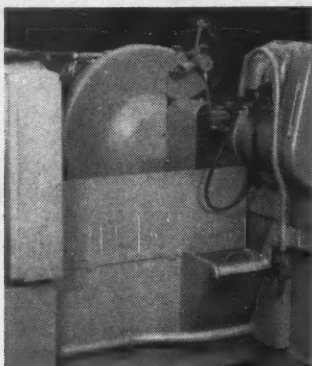
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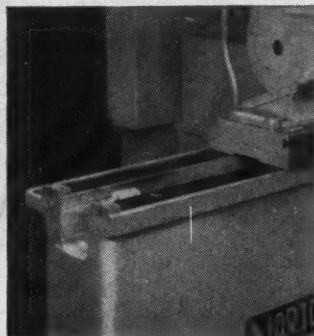
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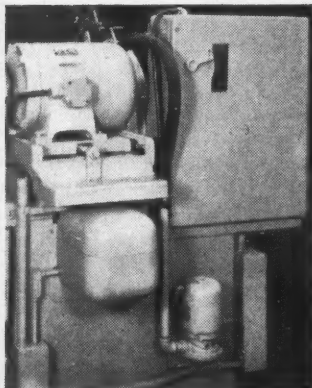
Here are the ^{new} features production men like .



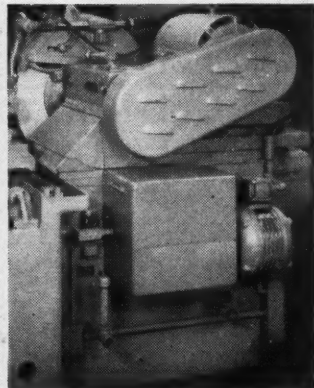
Rear base design offers maximum accessibility to hinged guard for wheel change. Note ramped outlet for easy sludge removal.



Steel ribbon type guards provide complete protection of base ways and reduce grit infiltration. Neat and compact, they require no extra floor space, and allow a more rigid table design.



Electrical equipment servicing made easy. Major controls located in elevated, accessible cabinet. Note rigid conduit.



Pumps and motors mounted outside base to insure convenience and minimum time consumption in maintenance and service.

...in the **NORTON TYPE CTU CYLINDRICAL GRINDERS**

FINE all around service — whether on high production, or on job lot runs — is delivered by the new NORTON type CTU 6" and 10" Cylindrical Grinding Machines.

They have increased rigidity through new features in design. This rigidity fortifies their unique ability to stand up under heavy service. It also prolongs the fine quality of precision they offer.

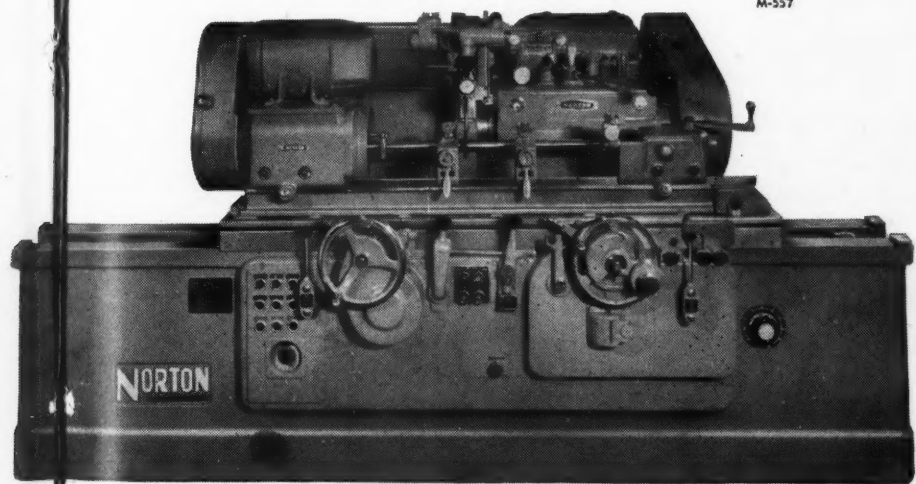
Easy loading, the many new features described on the opposite page, plus new flexibility and the scientific positioning of controls, all make for greater operating ease, and for the very important factors of low work and maintenance costs.

NORTON 6" and 10" Type CTU machines are made in plain and semiautomatic arrangements — write for catalog.

NORTON COMPANY, WORCESTER 6, MASS.

New York - Chicago - Detroit - Cleveland - Hartford
Distributors in All Principal Cities

M-557



The NORTON 10" x 36" Type CTU Semiautomatic Cylindrical Grinder

NORTON GRINDERS
and Lappers



Found in the BEST PRODUCTS

• Any product is only as good as its fastenings. The best-made machines and equipment always employ fastenings that are as capable and efficient as the products of which they are a vital part.

Chicago "Safety Plus" Socket Head Screws are used in many of the finest screw-fastened products manufactured today. They improve these products by providing the greatest fastening strength with the least possible weight.

"Safety Plus" fastenings are made of the highest quality materials and manufactured under the most modern processes. They are close-tolerance tested throughout every step of production to assure absolute perfection in thread and dimension. You'll find them superior in every way for your product.

*These Fine Products are sold only
thru Authorized Distributors*

CHICAGO "Safety Plus" line includes:

Socket Head Cap Screws
Socket Set Screws
Stripper Bolts
Square Head Dog Point Set
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Socket Pipe Plugs
Keys for "Safety Plus"
Products

Complete line includes:

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Square Head Cup Point Set
Screws
Headless Set Screws
Fillister Head Cap Screws
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Castellated Nuts

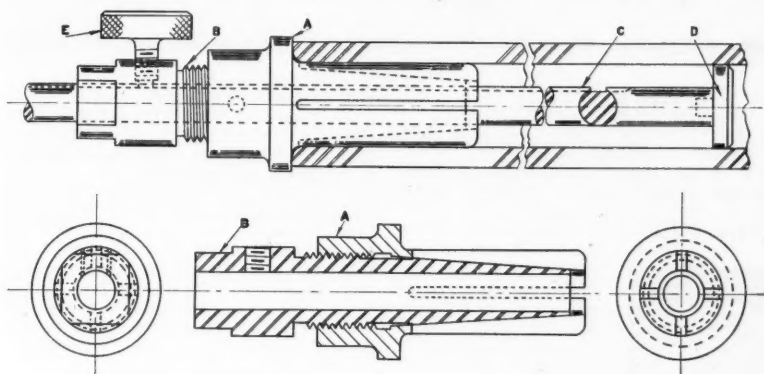
THE CHICAGO SCREW CO.

ESTABLISHED 1872

1026 SO. HOMAN AVENUE CHICAGO 24, ILL.

& Shipley lathe which was equipped with a spindle with $1\frac{3}{8}$ in. bore. With work held in a collet chuck, and the

easily and quickly removable. The body will vary in diameter for different sizes of spindles, also in length. The tapered



Adjustable Spindle Stop for Engine Lathes

carriage locked, by using this stop all of the pieces will be of uniform length. It is not necessary to scribe lines on the work nor to make any measurements after the tool has been set correctly.

The stop consists of (A) the body, (B) a tapered plug and rod holder, (C) the rod, (D) the stop button, and (E) knurled head locking screw.

The body (A) may be of cast iron or steel. The expanding principle as applied to the body is used to allow for plus or minus variations in any one spindle size and also to make the stop

plug (B) is of heat-treated steel, taper ground. The rod (C) extends the full length of the spindle to the collet. The button (D) on the end of the rod is about $1/64$ in. smaller in diameter than the diameter of the spindle bore. The locking screw (E) is provided to lock the rod firmly in place. As indicated by the dotted circle on the side of the body (A), a hole may be drilled for application of a spanner wrench.

The application of the spindle stop will be obvious from a study of the drawing. The tool will save its cost many times over.

AIRLOX

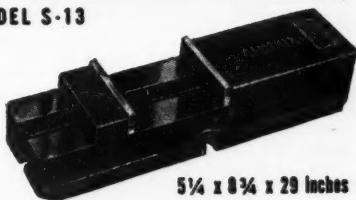
PNEUMATIC and Hydraulic Vises

Jaw force: 90 times air-line pressure

Write for Data Sheet T

production devices, inc. Whitehall, New York

MODEL S-13



5 1/4 x 8 3/4 x 2 1/2 inches

News of the Industry

Hans B. Kraut

The American machine tool industry lost a valuable member in the passing of Hans B. Kraut, Chairman of the Board of the Giddings & Lewis Machine Tool Company, who died at his winter home in Tucson, Arizona, December 28, 1947.



HANS B. KRAUT

In his 23 years with Giddings & Lewis, Mr. Kraut had built up the company from a small shop to one of the most modern and best known machine tool manufacturing firms in the world.

Mr. Kraut, who would have been 67 years old in April, was born in Kraiburg, Germany, in a family whose members have been mechanics and craftsmen for generations. He was a graduate

mechanical engineer and had served an apprenticeship in various well-known German machinery plants. He came to the United States in 1906 and started his career here by serving a further apprenticeship with the Pullman Company. Later he joined Jos. T. Ryerson & Sons, Chicago, and for some years was mana-

ger of their Machinery Department. In 1924 he joined Giddings & Lewis as Vice President and General Manager, eventually becoming President and Chairman of the Board of Directors.

In addition to his task as the directing head of his company, Mr. Kraut found time to participate in many civic and organizational activities. His loss will be felt keenly not only by his associates in the Giddings & Lewis Company and in his community, but also by his host of friends in the Machine Tool Builders' Association and the metal manufacturing industry.

Williams Equipment and Supply Company Moves to New Location

Williams Equipment and Supply Company, formerly located at 3016 E. McNichols Rd., Detroit 12, Michigan, has moved to a new business address. The new business address is as follows: Williams Equipment and Supply Co., 714 Donovan Building, Detroit 1, Michigan.

Kennametal Inc. Establishes New York Office

Kennametal Inc., of Latrobe, Pa., announces the opening of its own Eastern District office at 6 West Broadway, New York City, for the distribution and servicing of Kennametal cutting tools and wear-resistant parts in eastern New York and northern New Jersey.

Standard tools and blanks will be stocked for making prompt deliveries to plants in the area, and engineering service will be maintained. The new office is in charge of L. D. Morton as Eastern District Manager, and J. G. Brady will serve as Representative. Both of these men are competent tool engineers of long experience.

Please mention MODERN MACHINE SHOP when writing to advertisers.

SOUTH BEND LATHE COLLETS



Steel and Brass Collets for use in any make of lathe or other machine that they will fit.

SPECIFICATIONS

Collet No.	Thread Dia. In.	Thread Length In.	Ts'ls Per In.	Body Dia. In.	Collet Length In.	Head Dia. In.	Head Taper Deg.
3	.650	3/4	26	.6495	2-11/16	.852	12
2	.855	13/16	20	.8595	3-5/16	1.095	15
5	1.250	3/4	20	1.2495	3-9/32	1.452	10
4	.950	13/16	20	.9495	3	1.150	10

	No. 3	No. 2	No. 5	No. 4
STEEL COLLET	\$3.75	\$4.00	\$4.75	\$4.25
BRASS COLLET	2.00	2.25	2.50	2.35

SOUTH BEND LATHE WORKS

427 E. Madison St.
South Bend 22, Ind.

Introducing a new **SMALL SIZE**

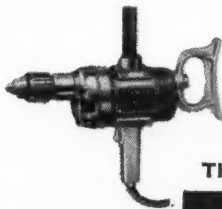
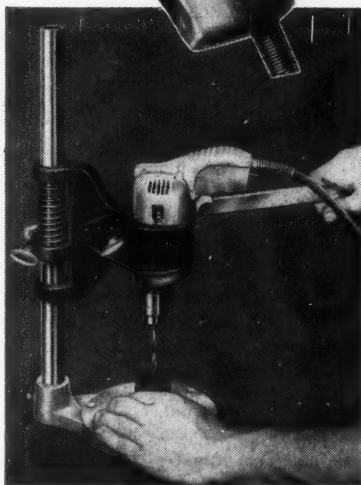
the No. 24



ELECTRIC DRILL by Stanley

It's a fist-ful of power . . . for drilling metal, wood or composition materials. Light enough to swing easily overhead or horizontally at arm's length. Compact enough for close-quarter work. Made the way Stanley makes all tools . . . sturdy, for years of useful life. Capacity, $\frac{1}{4}$ "; length $8\frac{1}{4}$ "; weight, $3\frac{1}{4}$ lbs.

Economical drill press . . . Locked in the Stanley Drill Stand No. 514, the No. 24 doubles its utility . . . becomes an efficient drill press for a variety of light drilling jobs.



Stanley Electric Drills come in a full range of sizes for wood or metal drilling. Available from Stanley distributors. Write for descriptive literature. Stanley Electric Tools, 520 Myrtle Street, New Britain, Conn.

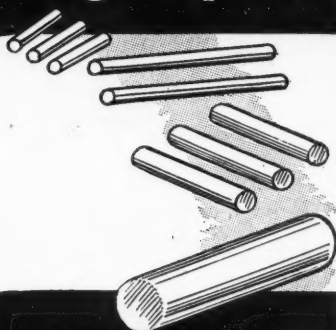
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HARDWARE • HAND TOOLS • ELECTRIC TOOLS

Precision ROD CUTTING at High Speed



with the New
**DI-ACRO
ROD PARTER**

This newest member of the DI-ACRO family of "DIE-LESS DUPLICATING" Machines brings you accuracy, speed, capacity range and ease of operation fully up to the standards established by DI-ACRO Precision Benders, Brakes, Shears.

Do you require precision?—The DI-ACRO Rod Parter holds tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

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All hot and cold rolled rods

Stainless steel

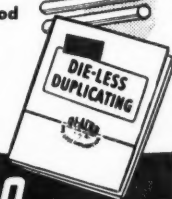
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Copper Brass

Aluminum Bi-metals

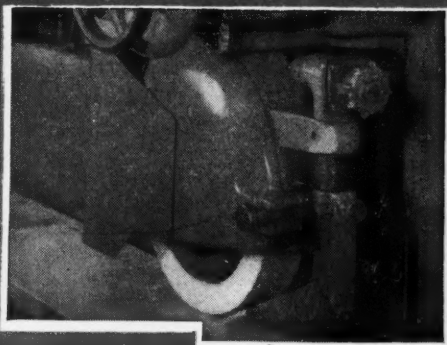
Many types of plastics

Fibre Rubber Wood



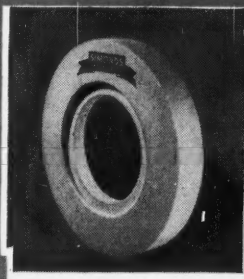
the grinding job

Horizontal surface grinding of alloy steel stock on a Mattison Precision Surface Grinder. Repeated precision results and a fine finish on a production basis make grinding wheel selection of prime importance.



the wheel

W Borolon vitrified bonded WA36-J8-V1, size 20" x 3" x 10" c/s one side 12 1/4" x 5/8"; c/s other side 12 1/4" x 1". Selected for cool, fast grinding without danger of burning stock. Efficient for grinding hardened and high speed steel; special alloys including high carbon high chrome types.



Borolon **Electron**
ALUMINUM OXIDE SILICON CARBIDE

SIMONDS
ABRASIVE CO.

PHILADELPHIA, PA.

Grinding Wheels

Complete line includes every shape and size.

Abrasive Grains

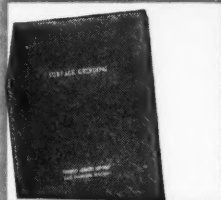
Mounted Wheels and Points

Surfacing Segments

Bricks and Sticks

where to get it

Simonds Abrasive Distributors in all principal industrial centers of the U. S. and in many foreign countries carry stocks and can advise on grinding wheel selection. Write today for Manual on Modern Surface Grinding Practice. Also for name of nearest distributor.



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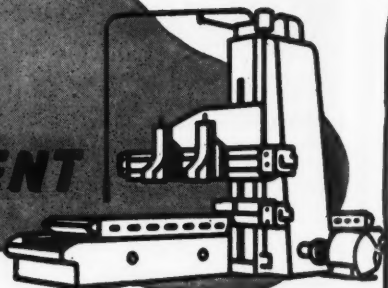
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STEEL WHEELS
Special Steels

SIMONDS
GRINDING WHEELS
Simonds Products for Canada

Quality control has characterized Simonds Abrasive Company products during more than 50 years as a major manufacturer of grinding wheels and abrasive products exclusively. This control begins with the abrasive grain produced in modern electric furnaces by Simonds Canada Abrasive Co., Ltd., and extends to the finished wheels for all types of grinding from roughing to precision finishing. This means consistently high wheel performance on every grinding job.

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

NEW SHOP EQUIPMENT



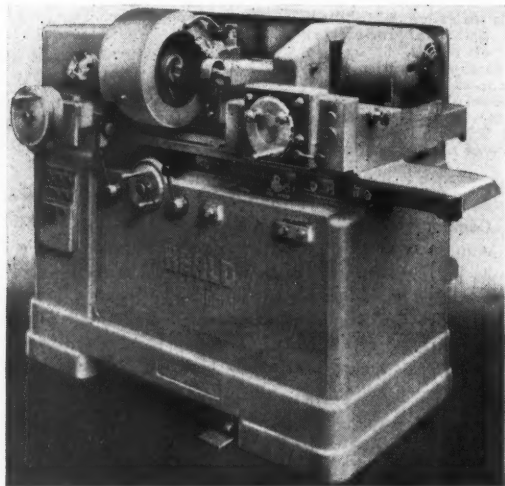
Heald Model 271 Toolroom Internal Grinding Machine

Product of The Heald Machine Co., Worcester 6, Mass., the Heald Model 271 Toolroom Internal Grinding Machine illustrated herewith is designed for the rapid, efficient handling of toolroom work where precision internal grinding is required. The machine is constructed to provide for extremely quick setups, thus assuring maximum change-over time between jobs, and is engineered for maximum output with simple, easy operation.

A highly versatile machine, the Heald Model 271 Internal Grinder can be readily adapted to a wide variety of parts and a range of work sizes. The workhead may

be conveniently and accurately swiveled, thus providing a wide angular capacity for table work. A sine bar attachment may be applied for high precision settings. Primarily intended for toolroom applications, the fast semi-automatic grinding cycle provided by the machine is also said to make it ideal for the effective handling of small-lot production runs.

Outstanding construction features of the Heald Model 271 Toolroom Internal Grinding Machine include structural rigidity; smooth-operating hydraulics with constant feeds and speeds; isolation of pump and motor units; improved ring-type cylinders with special distortion-free mountings; and easily accessible self-adjusting brakes.



Sidney 32-Speed 16-Inch Toolroom Lathe

A 16-inch toolroom lathe featuring a 32-speed, preselective dial controlled, all-herringbone geared headstock is now being manufactured by The Sidney Machine Tool Co., Sidney, Ohio. The spindle and all long intermediate shafts are supported by anti-friction center bearings in addition to the conventional end bearing mounting. The spindle is mounted in such a manner as to automatically compensate

Heald Model 271 Toolroom Internal Grinding Machine

CUMMINS
DIESEL



"Known by the Company it Keeps" ... SIZE CONTROLS Centerless Lapping Machine



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FRIDEN CALCULATING MACHINE CO., INC.

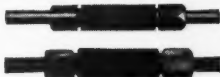
FRIDEN

Follow the leaders of industry and replace slow, inaccurate, costly methods with the Centerless Lapping Machine.

With this Centerless Lapping Machine you obtain, without special operating skill, precision finishes of less than 2 micro inches on such materials as steel, glass, carbide, carbide and sapphire. No costly set-ups or special tools. Handles diameters .01 to 10.00". Automatic feed attachment available.

You'll find this unit ideal for lapping over-size bearings, lapping and sizing bearing races, bushings, shafts and cylinders; for lapping oversize gages; for salvaging worn gages by lapping to the next lower size. Send for Catalog 47.

Size Control Reversible "Go" and "No-Go" Plug



Gages give 6 times service life.

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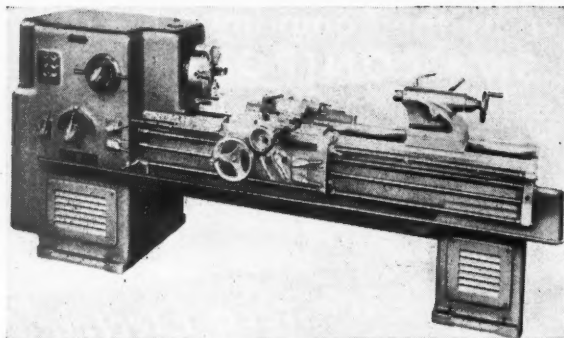
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**Sidney 32-Speed 16-Inch
Toolroom Lathe**

for expansion caused by temperature rise.

The headstock design is unique in that the 32 spindle speed changes are effected through the use of only 16 herringbone gears. The shifting mechanism is entirely mechanical for simplicity and trouble-free operation. Lubrication is automatic throughout.

The gearbox of the machine is totally enclosed, with all moving parts operating in oil. Sixty changes of feed from 0.0028 to 0.174 inch and 60 changes of threads

are available by means of the convenient dial control. The heavy duty apron of the lathe is of double-wall construction, with all shafts rotating on anti-friction bearings. The centrally located pump and reservoir provide automatic lubrication to the cross slide, carriage bed ways, lead screw, and all moving parts in the apron. The cross feed and longitudinal feed are effected through positive clutches.

The lathe bed is cast of a steel-nickel-gray iron mixture and is designed with four longitudinal walls and double cross girts spaced at 12-inch intervals. The tailstock is provided with a direct length reading dial to indicate the longitudinal movement of the spindle. The dial can be easily reset to zero for convenience in

Libert

Hi-Speed

SHEAR

CIRCLE CUTTING
ATTACHMENT
Included as
STANDARD EQUIPMENT
with this Machine



**MODEL
1236**
36-in. throat.
12-gauge
capacity.

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**SIMPLIFIES Maintenance
SPEEDS Production
SAVES Manpower**

The *Libert* has amply proved its advantages by turning out top production—shearing flat or formed sheet metal, internal or external, plain or irregular shapes *rapidly, accurately, cleanly!*

Equally effective in maintenance work, *Libert* is cutting costs to rock bottom. Edges are smooth, need no finishing. Unskilled operators produce accurate work at once.

Sizes up to 60-in. throat, 10-gauge capacity.

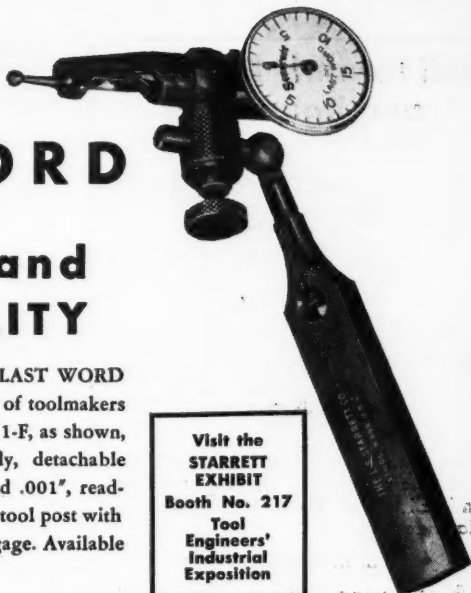
LIBERT MACHINE COMPANY
Green Bay, Wisconsin

IT'S THE Trade Mark LAST WORD

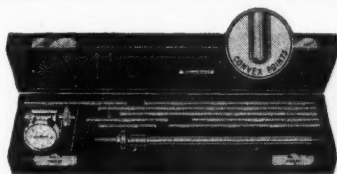
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in UTILITY and ADAPTABILITY

The universal adaptability of Starrett LAST WORD Indicators has made them the favorite of toolmakers and mechanics the world over. No. 711-F, as shown, has reversible action, swiveling body, detachable ratchet joint contact point — graduated .001", reading 0-15-0. range .030". Can be used in tool post with universal shank or clamped to height gage. Available in other models and calibrations.



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Industrial
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INSIDE DIAL GAGE NO. 697

An excellent gage for checking parallelism or comparing internal diameters. Zero-setting dial graduated with wide divisions by thousandths, reads 0-.020-0. Ten interchangeable rods and one 8" extension provide a range from 2 1/4 to 18 inches.

**DIAL
DEPTH
GAGE
NO. 640**



Press the spindle button and this gage registers the depth of holes, slots, recesses, etc., by half-thousandths. A tell-tale hand and double dial count revolutions of the large hand. Normally furnished with 1/2" range, dial reading 0-50. Also available as direct reading, reverse movement gage with spindle normally extended (No. 640-R).

For complete information, write for new Starrett Dial Indicator Catalog "MD"

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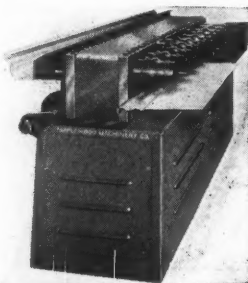
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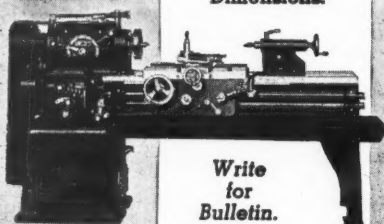
Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

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16"



12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.

Modern Design—
Liberal
Dimensions.

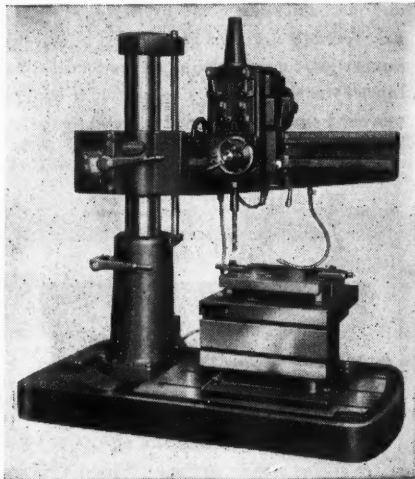
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**THE CARROLL & JAMIESON
MACHINE TOOL CO.**

drilling in blind holes. The front of the tailstock spindle is beveled at 30 deg. for setting threading tools. An index line indicates the spindle center line.

Canedy-Otto "Bantam" Radial Drill Press

The Canedy-Otto Manufacturing Co., Chicago Heights, Ill., announces a "bantam" size radial drill press with a maximum operating capacity of 1 inch in cast iron. The machine is available with a 3-foot arm and 7-inch column, has 9 spindle speeds, and is provided with a single-speed motor and 6 rates of power feed.



Canedy-Otto "Bantam" Radial Drill Press

Two motors are used, one main driving motor for the head mechanism and one fractional horsepower motor for the power elevating mechanism of the arm. All shafts are mounted on ball bearings, a total of 40 ball bearings being used in the machine.

The unit has a base consisting of a semi-cast steel casting with integrally cast tank for easy adaptation of a coolant system. The 7-inch column is of tubular steel with the ends welded into position, and is turned and ground to accurate tolerances. The head and arm are of semi-cast steel which is heat treated and normalized and are machined to close

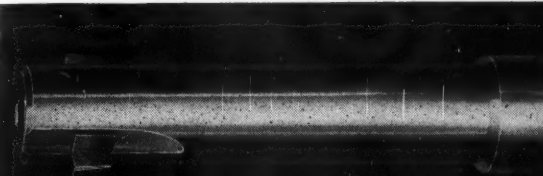
MADISON *BOREAMING

performs miracles with minutes

Madison Boreaming drastically cuts time from hole finishing and improves the quality of the holes obtained. It is possible only by teaming together the new Madison Rough Boring Tool and

* Completed Boring Operation

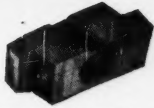
the Madison Finish Boring Tool. Teamed together for Boreaming, these two tools deliver finished holes usually achieved only through the use of three to five ordinary tools.



MADISON ROUGH BORING TOOL in most cases removes as much stock in one pass as an ordinary single point tool removes in three passes . . . and at faster speeds. It delivers holes ideally prepared for a better finishing job by the Madison Finish Boring Tool.



MADISON FINISH BORING TOOL on most jobs delivers holes with finish so fine that it seldom requires any additional finishing operation. Cutter may be floated in the bar. No special tool holders or chucks necessary.



Rough Boring Cutter



Finish Boring Cutter

Design features of the Roughing and Finishing Cutters have been proven for over thirty years. Both cutters have the exclusive one-screw adjustment feature. The cutter blades form their own cutting block. No delicate or loose parts to break or lose, or waste time in adjusting.

FEATURES OF MADISON *BOREAMING

1. It is often practicable to combine roughing and finishing cutters in one bar to perform roughing and finishing in one pass of the tool.
2. A Madison cutter may be slipped from a Madison bar and set to a different diameter or replaced by a sharpened cutter in a matter of seconds.
3. The cutter of a Madison Finish Boring Tool may be floated in the bar. No special floating tool holders or chucks necessary.
4. Madison Rough Boring Tool and Madison Finish Boring Tool are interchangeable in the same setup. Permits performance of both operations successively if desired.

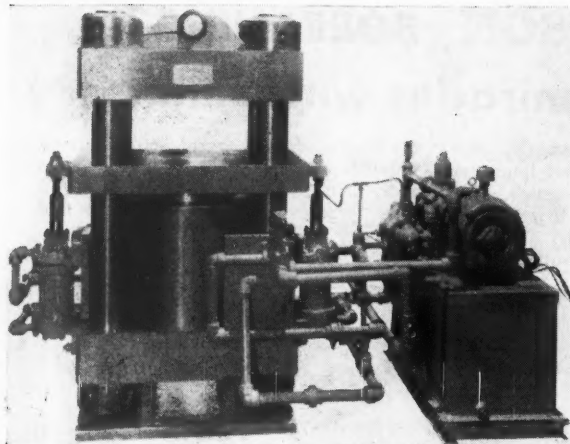


Write for the new
Madison Catalog.



MADISON

MANUFACTURING COMPANY
DEPT. MM3 MUSKEGON, MICHIGAN



Schill Hydraulic Die-Hobbing Press

Schill Hydraulic Die-Hobbing Press

The Edward Franklin Schill Corp., 39 Cortlandt St., New York 7, N. Y., is now marketing a 400-ton hydraulic die-hobbing press of all-steel construction. The press, which is of the four-rod type, has an up-moving $6\frac{1}{2}$ -inch strokeram, daylight opening of 12 inches, and clearance between strain rods of 22 inches right to

left x 8 inches front to back. The ram can be adjusted to provide a stroke of from $\frac{3}{4}$ to $6\frac{1}{2}$ inches and a pressure of up to 400 tons. The cylinder is made of forged steel; the 16-inch diameter ram is made of close grain gray iron and has a working pressure of 4,000 lb. per square inch.

The up-moving platen bearings are bushed with hard bronze liners, closely fitted to the strain rods. The top platen and moving platen are equipped with tool steel hardened and ground plates for accommodating pressure of the work. The platens are of extra thickness to eliminate deflection under full pressure. The cylinder walls are also of extra thickness to prevent outward weave so that there is no seeping of oil past the ram. The hydraulic unit is operated by a $7\frac{1}{2}$ h.p. motor. The low pressure pump is a Racine type with high pressure booster.

The Schill Hydraulic Die-Hobbing Press is manually operated and is ar-

The feed transmission is an independent unit held in position and in proper gear mesh with the pick-off power transmission gears, and is easily accessible for maintenance. The feed clutch is a complete and independent unit which permits feeding either downward or upward. The main drive clutch is a multiple disc friction dual type, offering forward and reverse rotation for convenience in tapping. The spindle is of alloy steel which is hardened and ground and provided with a multiple spline. The spindle is counterbalanced within the head by an adjustable clock type spring, and includes a No. 3 Morse taper bore.

The arm of the machine is provided with a limit switch which is said to prevent movement of the arm beyond its extreme uppermost and lowermost position. A guard prevents operator from raising or lowering the arm while clamping.

The Schill Hydraulic Die-Hobbing Press is manually operated and is ar-



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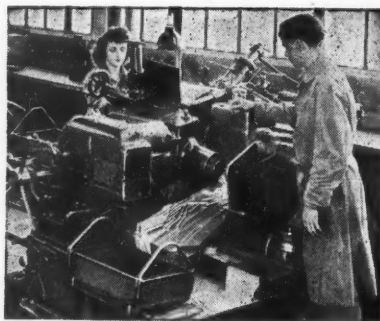
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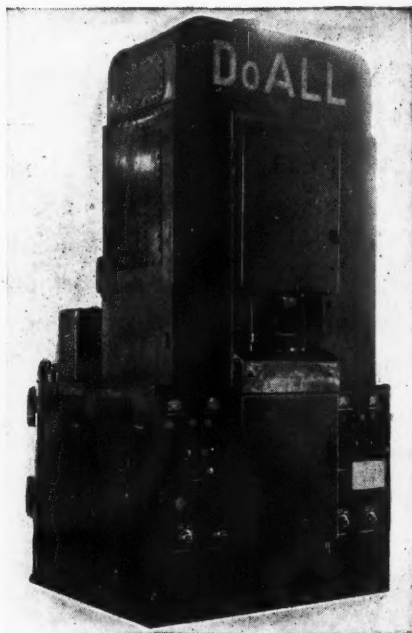
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ranged to provide a free closing speed of 75 inches per minute and an opening speed of 150 inches per minute.

DoAll 30-60 Ton Metal Powder Press

For the fabrication of parts from metal powder, the DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill., is offering a 30-60 ton press which is claimed to be unique in that the pressures are applied from the top and bottom as well as sides simultaneously through hydraulic cylinders.



DoAll 30-60 Ton Metal Powder Press

Variations in pressure on each cylinder are also obtainable by adjustment valves operating from a conveniently located control panel.

Each top and bottom center cylinder and each pair of top and bottom outside cylinders and the two side cylinders are operated by separately driven Vickers 14-gal. 2,000 p.s.i. pumps driven by an individual 20 h.p. motor at 1,200 r.p.m. This unique cylinder setup and ram action makes the

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TREET-ALL



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Complete details of each unit are available in Bulletin HD-1147—send for your copy—today.

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DRY TYPE TRANSFORMERS—CONSTANT CURRENT REGULATORS

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press adaptable to a wide variety of shapes, either cored or solid. The advantage of this type of hydraulic drive is that each set of cylinders can be individually adjusted for rate of travel on both the power stroke and the return stroke. They can also be regulated for pressure. The rate of travel on the power stroke is adjustable from 0 to 100 inches per minute and the return stroke from 2 to 200 inches per minute. Regulation for both speed and pressure is handled from the control panel.

The press is equipped with positive mechanical stops for dimensional control. Relief valves are provided for density control. The feed mechanism is a patented air injection type which is said to assure uniformity of quantity in the die cavity. The press is fully automatic for high production runs. It is also equipped with jogging buttons on each motor for setting up dies. The production rates on the press are dependent on the size of part being produced. However, parts can be made at a rate of up to 150 per minute.

The company also has available a 100-ton powder metal press. This press has a single-acting top cylinder and two single-acting bottom cylinders. The two bottom cylinders are coupled together to act as one and are so spaced as to permit the use

of a stationary core rod. The hydraulic cylinders in the press are actuated by an 18-gallon per minute Vickers pump at 2,000 p.s.i. The pump is driven by a 20 h.p. motor.

South Bend 14-Inch Precision Drill Press

Available in both bench and floor models, a 14-inch precision drill press having a capacity for drilling $\frac{1}{2}$ inch in iron or steel at the center of a 14-inch circle is announced by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind. Features of the machine include a built-in light with independent switch which provides shielded illumination for the work area, thus eliminating the necessity of installing a separate lighting fixture. A quick-acting belt tension release lever simplifies changing the spindle speeds and returns the vertically mounted motor to its original position after each change, thus maintaining the same belt tension for each of the 4-cone pulley steps.

The spindle has a maximum travel of 4 inches and speeds of 707, 1,305, 2,345, and 4,322 r.p.m. The free-floating spindle



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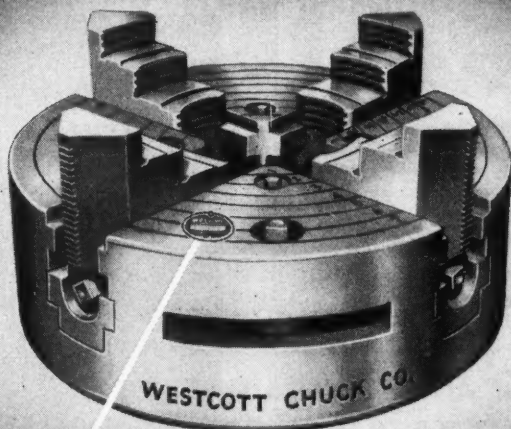
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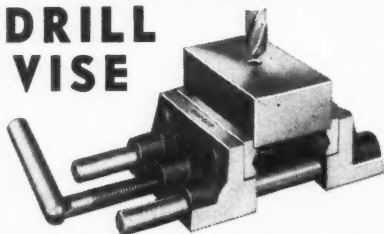
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Holds square, rectangular or round parts. Jaws 5" across that open up to full 5" wide. Horizontal V-grooves for holding rounds up to 2" in diameter. Built in parallels for locating flat or rectangular parts.

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Pinion & Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

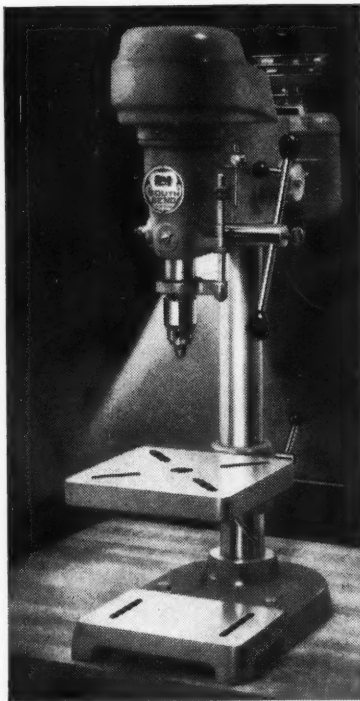
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design is said to prevent misalignment, side thrust, and whip. The depth gage is graduated in sixteenths of an inch and has adjustable collars for controlling the depth of feed and the length of the return stroke. Two precision ball bearings accommodate the drive unit load, and two additional ball bearings support the spindle which is spline driven. All ball bearings, being prelubricated and sealed, require no oiling. The spindle quill bearing has an adjustment to compensate for quill wear.



South Bend 14-Inch Precision Drill Press

The full tilt type table of the machine has a 10 x 10-inch precision ground top surface with slots for clamping fixtures or work. An improved type of double plug binder is provided for locking the table quickly and firmly in any position on the 2 3/4-inch diameter column.

The bench model drill press has a 10 1/2-inch maximum chuck to table distance, 10 1/2-inch table travel, 17-inch maximum

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urn
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Save Hours
of Set-Up Time... with this NEW
TAFT-PEIRCE

Magnetic Angle Plate



This new Taft-Peirce precision tool gives you the exceptional dependability and holding power of T-P's famed SUPERPOWER Magnetic Chucks—over a wide range of work requiring either single or compound angle set-ups.

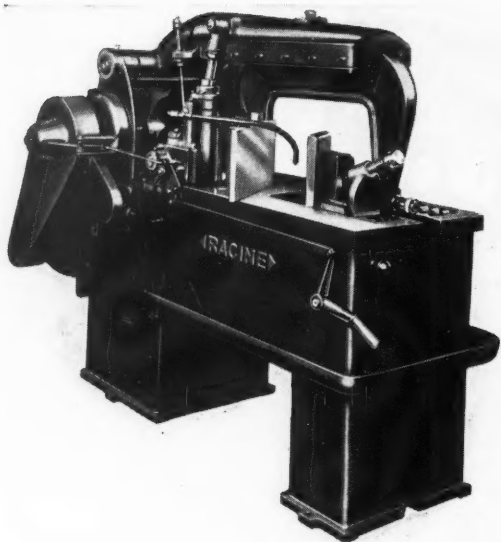
It's no longer necessary to adjust angle plates, clamps, and bolts to position a tricky angle-grinding job. Any angle can be established in much shorter time than ever before, and there is nothing to interfere with the grinding operations. This new T-P Magnetic Angle Plate measures 6" x 6" x 4 $\frac{5}{8}$ " high; costs \$350 complete.

Write to The Taft-Peirce Mfg. Co.,
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Available for either 110
or 220 volts, D. C.
(Specify which when
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T-P means TOP PRECISION





Racine "Oil Cut" Model Hydraulic Metal-Cutting Machine

Racine "Oil Cut" Model Hydraulic Metal-Cutting Machine

A fully hydraulic cut-off machine for all types of metal in sizes up to 10 x 10 inches, designated as the "Oil Cut" Model, has been brought out by the Racine Tool & Machine Co., 1770 State St., Racine, Wisconsin.

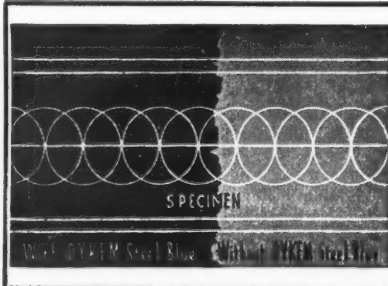
Feed and pressure control, rapid traverse, and the lift on the non-cutting stroke are all hydraulically operated. A single lever located at the front of the machine provides for regulation of the rapid traverse and clutch. A push-pull lever allows for a gradual lowering of the frame and blade for measuring the cut-off lengths of stock.

chuck to base distance, 10 $\frac{3}{4}$ x 17 $\frac{3}{4}$ -inch slotted base with precision ground top surface, 35 $\frac{1}{2}$ -inch overall height, and domestic shipping weight of 195 lb. The floor model drill press has a 40 $\frac{1}{2}$ -inch maximum chuck to table distance, 40 $\frac{1}{2}$ -inch table travel, 46 $\frac{1}{2}$ -inch maximum chuck to base distance, 15 x 21-inch slotted base with precision ground top surface, 65 $\frac{1}{2}$ -inch overall height, and domestic shipping weight of 235 pounds.

The drill press is supplied with or without a motor, as desired. A $\frac{1}{2}$ h.p., 1,725 r.p.m. vertical mounting type motor is recommended. An on-off switch, motor line connection cord, V-belt, motor pulley, and 0 to $\frac{1}{2}$ -inch capacity chucks are standard equipment.

Williams Model F-1 Die Making Machine

The Williams Model F-1 Die Making Machine shown herewith has been developed by the Connecticut Tool & Engineering Co., 544 Iranistan Ave., Bridgeport 4, Conn. According to the manufacturer, the construction of the machine is such that the table is in accurate alignment with the file holders at all times and can be tilted in any direction by means of a cradle and rocking arrangement which is accurately calibrated to a 10-minute reading on verniers. The top of the table is symmetrically grooved to eliminate file dust. Hardened and accurately ground rear and center guide rods operating in



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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Boxocket

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Here is a typical application that demonstrates the importance of a Blue-Point Boxocket. Working space does not permit use of a socket wrench . . . sharp, projecting parts demand a wrench that provides knuckle clearance . . . the nut is large requiring ample leverage. This is a job that's a "natural" for a Blue-Point Boxocket. It slips on easily . . . completely encircling the nut and gripping firmly on all corners. Note how the offset handle gives ample clearance and avoids skinned knuckles . . . how the long handle length provides powerful leverage. These are features that add speed and safety to your jobs. Complete range of sizes. Direct factory branches are located in 40 principal cities to provide Snap-on's complete tool service to all important industrial areas.

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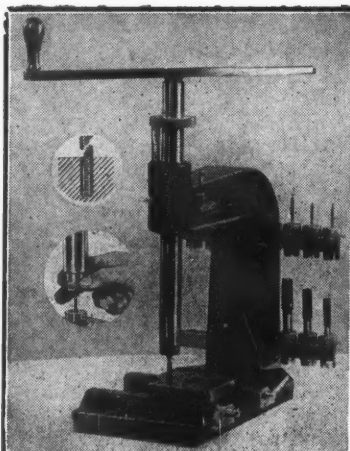
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BENCH MODEL NO. 12

A new bench model hand tapping machine of proven advantages. Will save you time, taps and rejects on your tooling and small lot production. Floor Type Tappers also available.

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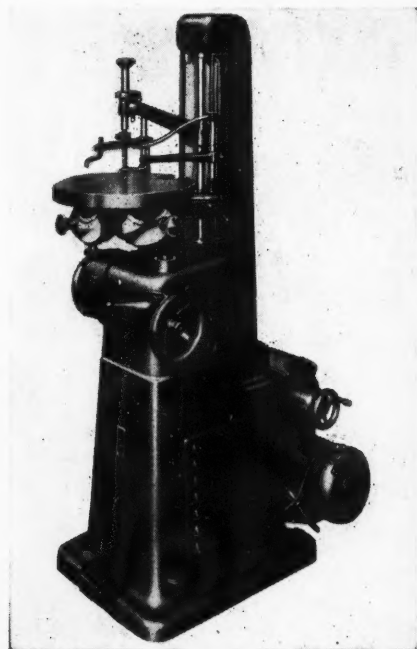
Formerly ROLLED THREAD DIE CO. and REED SMALL TOOL WORKS

Knurls - Thread Rolling Dies and Machines
WORCESTER 2, MASSACHUSETTS, U. S. A.

special alloy bushings and hydraulically cushioned support the two file holder brackets.

The extremely rigid ball bearing type main spindle of the unit transmits all of the forces from the crank drive directly to the body of the machine. The counter-balanced crank mechanism and all moving parts are bath lubricated. Two handwheels and a knob mounted on the spindle are used for setting and locking the file stroke to any desired length from 0 to 5 inches.

The design of the machine also includes a foot switch for starting and stopping



Williams Model F-1 Die Making Machine

reciprocation of the file, thereby leaving both hands free for handling work. A single press of the foot is said to stop or start the machine in motion. For safety, two finger support arms are adjustable to any position for holding the work to the table. A handwheel provides a means for raising and lowering the entire table unit, which is accurately counterbalanced for ease of operation.

Additional features of the Williams

HEAT TREAT

SMALL PARTS, TOOLS & DIES

In Your Own Plant

- Install anywhere by simple wire connection. Quiet in operation. No fumes or odors—no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts . . . Small batches . . . Running pilot lots to pre-determine mass production techniques . . . Emergency repairs . . . Industrial and laboratory testing . . . Miscellaneous controlled heating jobs.



CHAMBER	8"W 6"H 14"L				10"W 6"H 18"L				8"W 6"H 14"L			
FROM COLD	1850° F. in 55-65 min.				1850° F. in 55-65 min.				2000° F. in 2½ hrs.			
AMPERES	14.8 at 230 v.				19.6 at 230 v.				20.2 at 230 v.			
WATTS	3400				4500				4650			
MODEL*	MH-3	VH-3	MK-3	VK-3	MH-4	VH-4	MK-4	VK-4	VK-5			
PRICE	160.00	185.00	200.00	225.00	245.00	270.00	285.00	310.00	340.00			

* M models complete with hinged door and hearth plate.

V models have counterweighted vertical lift door.

K models include Selective Power Modifier for input control to correct temperature lag.

ACCESSORY EQUIPMENT

Electronic operated Veri-tron indicating and controlling pyrometer, with thermocouple and lead wire. . . . \$143.00
Same in self-contained, enclosed panel including line switch and fuses, with steel stand—completely wired. . . . 250.00
Steel stand with shelf. . . . 35.00

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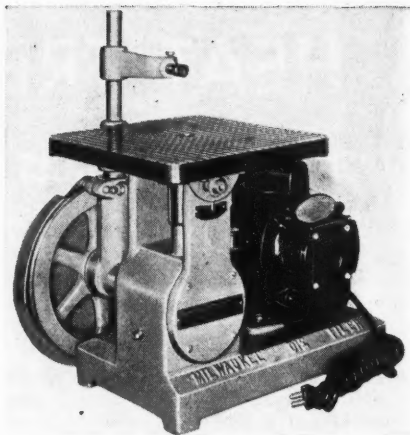
COOLEY ELECTRIC MANUFACTURING CORP.

34 South Shelby Street Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.

Export Manager, 44 Whitehall Street, New York, New York

Model F-1 Die Making Machine include an oil filler hole and visual gage which are conveniently located for checking lubrication. Power is furnished through a United States Vari-drive motor mounted on the rear of the machine. This unit is said to provide for shockless transmission of any and all speeds over a wide range. The speed of the take-off shaft can be adjusted while the driven machine is in motion by means of a conveniently located handwheel. The motor is a $\frac{1}{2}$ h.p., 1,800 r.p.m., 220/440-volt type. An air pump mounted on the end of the power motor provides a steady blast of air independent of the machine speed. A hose and jet direct the air to the working point.



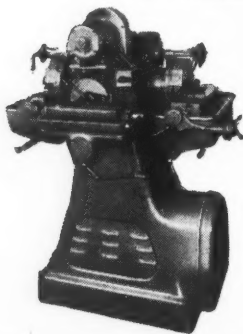
Milwaukee Improved Die Filer

Milwaukee Improved Die Filer

Improvements in the design of its versatile bench type reciprocal filing machine which are said to result in definite operating advantages and finer workmanship than heretofore are announced by the Milwaukee Chaplet & Manufacturing Co., Milwaukee, Wis. The ground surface of the tilting work table is serrated so as to keep the work surface free from chips and filings which might interfere with the smooth, level movement of the

workpiece during filing, sawing, or lapping operations. The table is equipped with a four-way tilting mechanism which enables the table to be tilted up to 15 deg. in any direction, thereby enabling

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Here's tool grinding at its best!

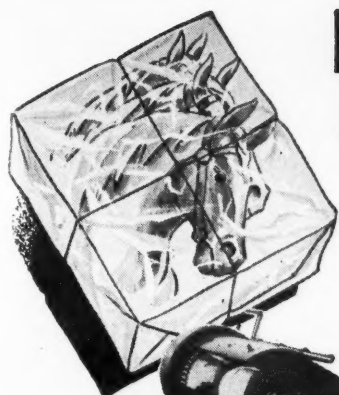
Employing 3-step progression—rough, semi-finish, and finish or hone—on one machine, this LeMaire 3-Wheel Grinder produces keener edge in fraction of time. Because tools go to diamond wheels in better condition, life of diamond wheels is considerably lengthened. Both labor and wheel costs are reduced—time is saved—production is increased.

Wouldn't you like to know more about this remarkable 3-Wheel Grinder? Send for descriptive folder.

LeMaire Tool & Mfg. Co.

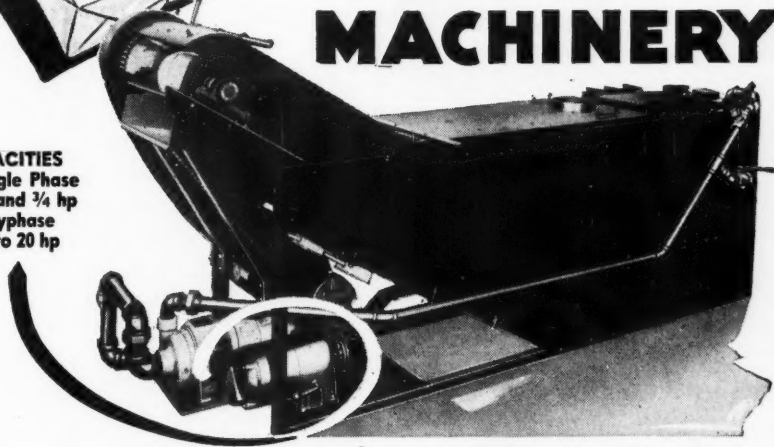
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Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-it Gear Chucks.



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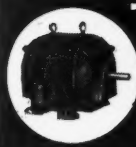
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Single Phase
1/2 and 3/4 hp
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1/2 to 20 hp



American Gas Furnace Company of Elizabeth, N. J., manufacturers of Special Quench Tanks as shown above chose LIMA multi-speed Gearshift Drives because of LIMA'S Reliable Performance Records.

Performance records of original equipment can be only as good as the component parts which are incorporated into the finished product. This is why so many manufacturers of Original Equipment choose LIMA multi-speed Gearshift Drives.

Let LIMA Engineers make a survey of your Drive requirements. There is no charge for this service.



THE LIMA ELECTRIC MOTOR CO.

166 FINDLAY ROAD

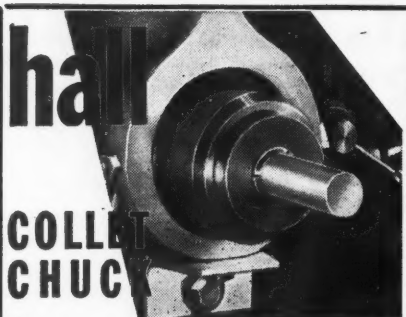
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COLLET CHUCK

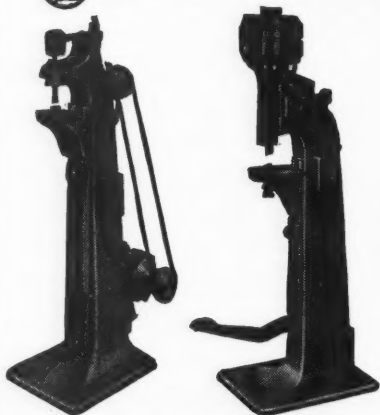
SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295;
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Round, square or hex collets, plain—serrated

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THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 3, Conn.

a wide range of angle filing, sawing, or lapping operations to be performed.

Additional features of the Milwaukee Improved Die Filer include a universal type chuck which permits adjustment to compensate for crooked or warped shanks on files or lapping stones, thereby assuring a perpendicular movement of tools and straight-line flat-surface cutting action. The safety belt guard which was formerly available as an accessory is now included as standard equipment of the machine.

Hammond Model C-4 Chip Breaker Grinder

For carbide chip breaker grinding, Hammond Machinery Builders, Inc., Dept. GP-21, 1615 Douglas Ave., Kalamazoo, Mich.



Hammond Model C-4 Chip Breaker Grinder

zoo 54, Mich., is now offering the Hammond Model C-4 Chip Breaker Grinder shown herewith. The machine features a vise having four swivels, each of which is equipped with a dial graduated in degrees, thus permitting the setting of tools at any desired angle. The machine is designed to accommodate all types of box

Bridgeport

TURRET MILLING MACHINE

THE BRIDGEPORT TURRET MILLING MACHINE has won universal acceptance. It has proved a most valuable time and labor saver in the tool rooms and production departments of the largest plants. Its wide range and versatility in milling, drilling, boring and shaping enable it to serve as the complete central machine around which all operations revolve in many small shops.

It will pay you to
explore the possi-
bilities of the
"BRIDGEPORT"
in your plant.



BRIDGEPORT MACHINES, INC.
52 REMER ST. BRIDGEPORT, CONN.



Heald Multi-Way Bore-Matic Precision Finishing Machine

50 or 60-cycle a.c. motor
or 220 or 440-volt 3-phase
50 or 60-cycle a.c. motor
or 115 or 230-volt d.c.
motor.

Heald Multi-Way Bore-Matic Precision Finishing Machine

The Heald Machine Co., Worcester 6, Mass., announces the addition to

and single point tools up to 2 inches.

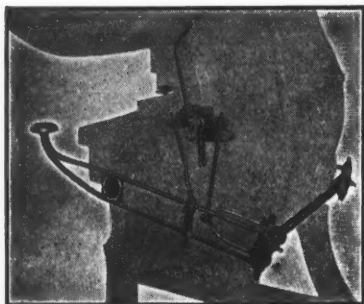
The table of the machine is a reciprocating type which has a maximum travel of $6\frac{1}{2}$ inches and is operated by a convenient hand lever that provides for free, precision movements. The machine spindle operates on precision bearings, the grinding wheel having vertical and cross traverse. The dials of the unit are graduated to 0.001 inch. The machine is of heavy construction with moving parts fully protected against grit sludge.

The Hammond Model C-4 Chip Breaker Grinder is available in both a bench and floor model. The bench model has a net weight of 300 lb., shipping weight of 340 lb., and occupies a floor space of 22 x 24 inches. The floor model has a net weight of 360 lb., shipping weight of 420 lb., base size at the floor of 17 x 18 inches, and requires a floor space of 22 x 24 inches. Standard equipment of the machine includes a vise, coolant tank, flexible lighting fixture, brake, reversing switch, and $\frac{1}{4}$ h.p. 110-volt single-phase

its line of Bore-Matics of a multi-way precision finishing machine. Designed for boring two or more holes from various directions simultaneously, the machine is furnished in two sizes as a Bi-Way (Models 232 and 332) and in two sizes as a Tri-Way (Models 233 and 333).

The Heald Multi-Way Bore-Matic is supplied with the "way units" set in the desired locations. The center section is furnished according to the requirements of the user's work. The way units may be operated separately if necessary, and up to three individual boring heads or a special multi-spindle head unit can be installed on each way unit.

In addition to boring operations, the Heald Multi-Way Bore-Matic can be used in performing facing, turning, chamfering, grooving, or fly-cutting operations. Such operations may be performed for finishing purposes only or for both roughing and precision finishing in one setting. The machine can be equipped with simple hand-operated fixtures for short-run work



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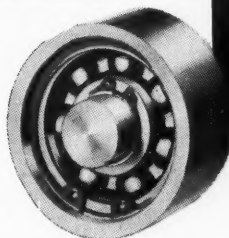
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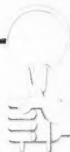
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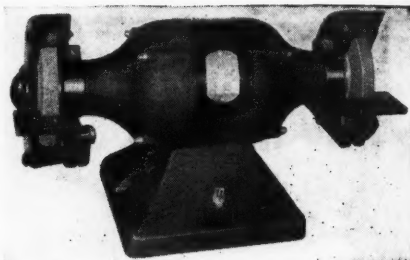
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or with fully automatic fixtures where high production volume is required.

Outstanding features claimed for the machine include an extremely fast operating cycle; uniform hydraulic feeds; versatile hydraulic cycle; adjustable brake timing; readily accessible controls; permanently located boring heads; smooth table motion; maximum rigidity and stability; automatic way lubrication; extremely large idlers; and hand control for brake release.



Standard "Cadet" Type 4BAS4 Bench Grinder

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, announces the addition of a bench grinder designated as the Type 4BAS4 to its "Cadet" line of grinding machines. The grinder is equipped with a $\frac{1}{2}$ h.p. 3,600 r.p.m. totally-enclosed motor for operation on 110 volts, single-phase 50 or 60-cycle current. It can also be furnished to order for operation on 220 volts, single-phase current.

The Standard Cadet Type 4BAS4 Bench Grinder is supplied complete with 10 feet of three-conductor No. 16 rubber-covered cable with two - prong attachment

Standard "Cadet" Type 4BAS4 Bench Grinder

plug. The safety type enclosed wheel guards of the unit each have an exhaust outlet, adjustable spark breaker, and work rest. A double-pole toggle switch is conveniently located in the base of the machine, which is furnished with two 6 x $\frac{3}{4}$ x $\frac{1}{2}$ -inch grinding wheels. The distance between wheels is 16 inches, and the height of the grinder to the center of the spindle is 6 $\frac{3}{4}$ inches. The net weight of the unit is 60 pounds.

Extra equipment available for the grinder includes safety glass eye shields and a floor pedestal having a tool tray with removable water pot.

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CONSTRUCTION
MAINTENANCE
AND REPAIR

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WITH *Easy to Operate*

TRINDL SUPER INDUSTRIAL ARC WELDERS

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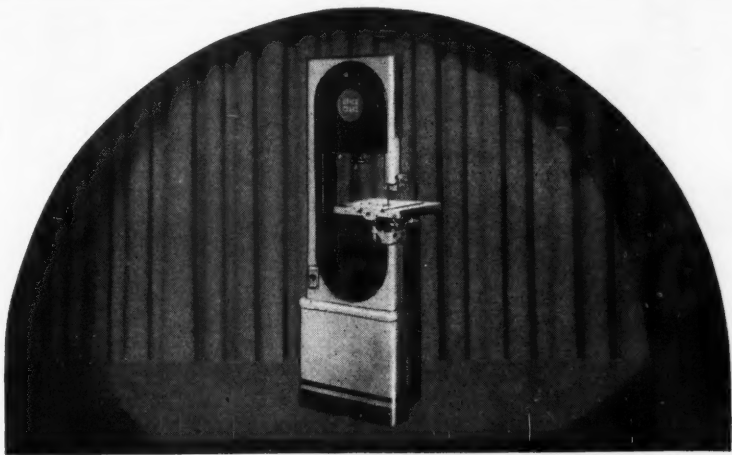
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FOR SPEED AND ACCURACY
in cutting practically any material

BOICE - CRANE No. 2300 14" BAND SAW

Operates at higher speed—4,400 blade feet per minute. Smoother and faster cutting. Sturdy enough for foundries and production. Accuracy to spare for tool and die work, like contour sawed cams, dies, and punches; ideal for experimental laboratories and pattern shops.

Single and 8-speed back-geared models for cutting practically any material. Clears 8½" under the guide.

One-piece welded steel frame has tremen-

dous strength. Wheels and blade, except at cutting point, are entirely enclosed. Cabinet type base has sealed-off motor compartment. High safety rating.

Blade guides adjust by a single control, and with full safety, even when machine is running. Close balance and light, but strong Textolite wheels permit twice the speed of other 14" machines. Less vibration, and longer bearing life. Saws wood two to four times faster. Often pays for itself in 3 to 6 months.

SPECIFICATIONS

Sawing Capacity: Blade to guard—13½". 27" dia. work. Guide to work table—8½".

Table: Tilts on Double Trunnions. Size 15"x15½".

Height Overall of Floor Model: 67"

Blade Widths: 3/16", ¼", ⅜", ½" and ¾"

Length of Blade: 98'

Wheels: Disc. Moulded Textolite. 14" dia. 1" face

Bearings: Grease-sealed Ball Bearings.

FOR A GUARANTEE OF SATISFACTORY SERVICE

specify only the products of manufacturers who **SPECIALIZE** in producing power tools, rather than making them a sideline.

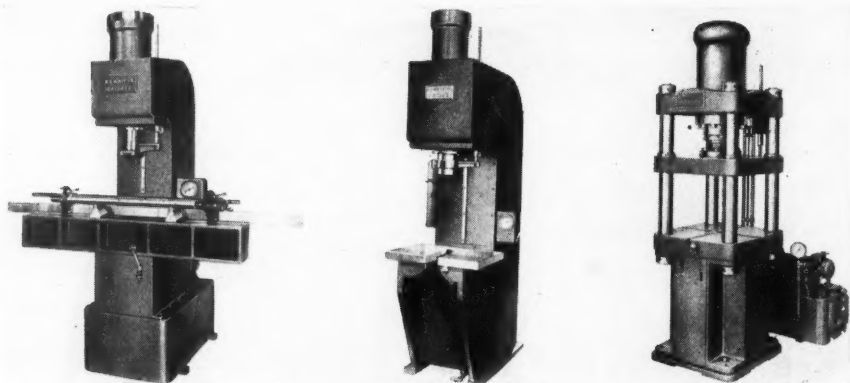
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(Left) Hannifin Model S-201 Standardized Hydraulic Straightening Press. (Center) Hannifin Model F-250 Standardized Hydraulic Forcing Press. (Right) Hannifin Model 4C-750 Hydraulic Column Type Press

Hannifin Standardized Hydraulic Presses

A standardized line of Hydraulic presses, including units for straightening, forcing, forming, assembling, broaching, and similar operations is announced by the Hannifin Corp., 1101 S. Kilbourn Ave., Chicago 24, Ill. The line comprises a total of 75 standard presses in capacities ranging from 6 to 150 tons which are available with a wide choice of control equipment, accessories, and fixtures.

The standardized presses are designated as Series S straightening presses, Series F forcing presses, and Series C column type presses. Series S presses are produced in 17 different models which are intended to meet virtually any straightening press requirement. Series F open gap forcing presses are offered in 10 different models. Both Series S and

Series F presses feature Hannifin's "Sensitive Pressure Control" as standard equipment. This control permits varying the ram pressure in proportion to the pressure on the control lever. The control can also be set to apply a uniform repetitive pressure on production work.

The Series C 4-column presses are built in 48 different models that provide a choice of 18, 36, and 60-inch space between columns, left to right, and in capacities ranging from 6 to 150 tons. Controls offered include manual, electric push button, and "sensitive pressure" types.

Steel City Model KDR Brinell Testing Machine

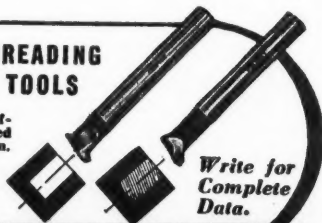
A Brinell testing machine which is said to be capable of checking up to 800 pieces



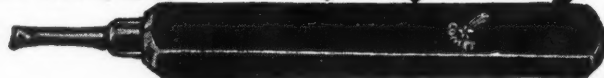
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For holes from 1/4" upwards, 15 different sizes. The accurate thread angle is maintained through each sharpening until tool is entirely worn down. Small head-long cutting surface for regrinding.

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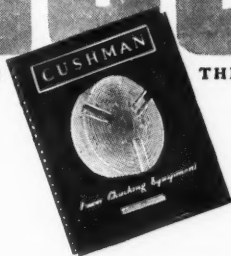


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THE CUSHMAN CHUCK COMPANY
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LEMPCO Pressurematic Press

... enables you to select the correct pressure for every job: press fitting, assembling, bending, straightening and die try-outs. Pressure builds from 0 to 60 tons in just four seconds. Movable head permits rapid centering of ram over work. Adjustable bolster accommodates large and small jobs. Strong, sturdy construction assures safety factors in excess of the limits of the press.

Lempco Pressurematic Presses are made in electric and hydraulic models, in 20, 40 and 60-ton capacities. Each will pay for itself many times over in your shop. Write for fully-illustrated catalog.

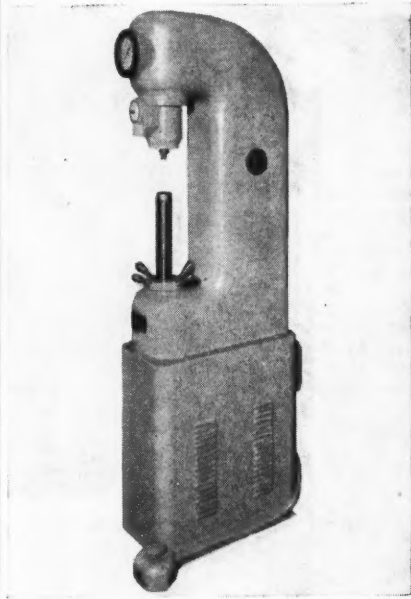


Exclusive
Automatic Pressure Control—stops ram travel at pre-selected pressure. Prevents costly spoilage, speeds assembling operations. Ideal for production line.

LEMPCO

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per hour, including parts varying in diameter and thickness as much as $\frac{3}{4}$ inch, without moving the elevating screw is announced by Steel City Testing Machines, Inc., 8843 Livernois, Detroit 4, Mich. Identified as the Model KDR, the machine is motor driven, hydraulically operated, and so constructed that the operator cannot remove the specimen being tested before the full load has been applied to the penetrator. The load is held for a predetermined time cycle (adjustable from 2 to 15 seconds' duration) after which time the penetrator automatically reverses itself to the starting position, ready for the next test.



Steel City Model KDR Brinell Testing Machine

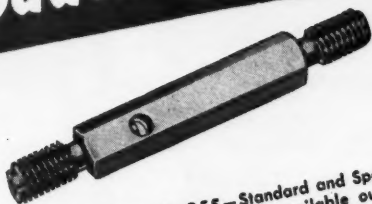
The Steel City Model KDR Brinell Testing Machine is equipped with a comparator indicator which is said to eliminate the necessity of using the Brinell microscope on production testing, and can be furnished with a foot or knee-type starter switch. The machine has a throat opening of 6 inches and a maximum vertical opening of 14 inches.

Standard equipment of the Model KDR Brinell Testing Machine includes flat and V-type anvils.

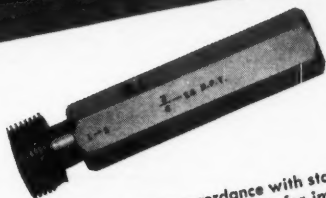
Lower Your Production Costs!



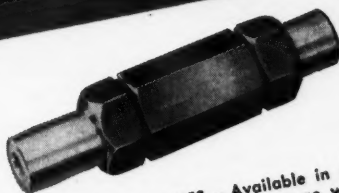
THREAD RING GAGES—Standard and Special Pitches—Precision Lapped—All available out of stock.



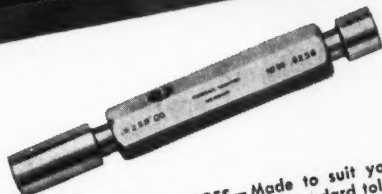
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PIPE GAGES—Made in accordance with standard specifications—Complete stock for immediate delivery.



DOUBLE DUTY GAGES—Available in size range .060 to 1.000—Reverse gage when worn in simple collet type handle.



CYLINDRICAL PLUG GAGES—Made to suit your requirements—Precision Lapped to standard tolerances.



CYLINDRICAL RING GAGES—Master and Working Gages made to order—Precision Lapped—All sizes.



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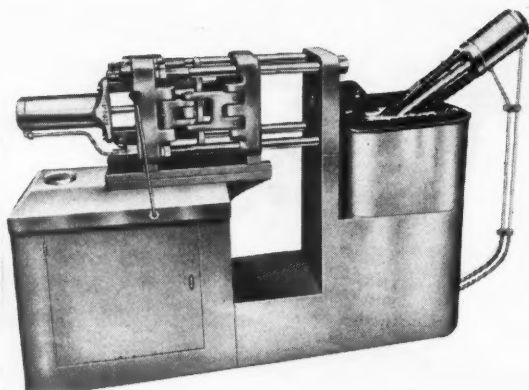
Quality control is the most important function and responsibility of management. Insure your product against "out of tolerance errors" by becoming more gage conscious. All our gages are made to A G D standards, precision lapped and processed for rigid Size Control and Size Stability. Chrome plate can be supplied if desired.

When the occasion demands the finest and consistently the finest—specify SCHRILLO. Special tools and gages made to your specifications. Consult our local distributor for prompt and courteous service.

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"Kwikast" Model 2ZH All-Hydraulic Die Casting Machine

"Kwikast" Model 2ZH All-Hydraulic Die Casting Machine

For the production of consistent hardware finish zinc base castings, Production Engineering Consultants, Los Angeles 16, Calif., is now manufacturing an all-hydraulic hot chamber die-casting machine designated as the "Kwikast" Model 2ZH. The machine embodies cold chamber

injection pressure for a 2-lb. shot, either center gated or 3 inches below. The unit measures 10 x 10 inches between bars and is designed to accommodate dies with thicknesses from 6 to 11 inches and with die half separation of 6 inches.

According to the manufacturer, the construction of the Kwikast Model 2ZH is such that the machine cannot be shot down when the dies are open. The unit utilizes non-flammable oil and has a high platen center line of 38 inches to reduce operator fatigue. The machine is operated by a single lever control which, when moved fully forward, provides for closing of the die and shooting. When the lever is returned, the machine is opened to allow for ejection of the casting, using a built-in ejection plate. The design of the unit includes a 300-lb. pot with 500 lb. per hour metal capacity. The angular metal

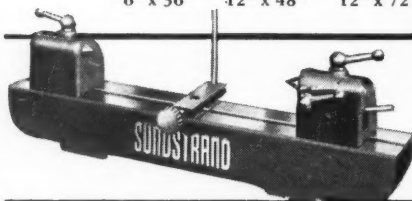


**CHECK RUNOUT TO
WITHIN .0001\"/>**

A precision tool for testing and checking parts between centers. Both heads adjustable, locked in place by lever-operated clamps. Work is held between one fixed center while spring loaded retractable center clamps work in position. Dial indicator with adjustable holder available as extra equipment.

COMPLETE RANGE AS FOLLOWS:—

6" x 18"	12" x 36"	12" x 60"
6" x 36"	12" x 48"	12" x 72"



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NO TWIST
EVEN ON THE
TOUGHEST JOBS**

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- Tap up to $\frac{1}{2}$ " dia.
- Run Nuts up to $\frac{3}{8}$ " dia.
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- Drive Studs up to $\frac{3}{8}$ " dia.
- Drill Masonry up to $\frac{3}{8}$ " dia.
- Extract Broken Studs up to $\frac{3}{8}$ " dia.
- Wire Brush up to $\frac{3}{8}$ " dia. shanks.

(Uses Standard Attachments)



AMAZING! No Kick—No Twist—Even if you stall the spindle completely, the motor continues to run.

AMAZING! It's Reversible—full power in either direction—runs on 110V ac-dc.

AMAZING! It saves up to 90% of the time on nut-running operations alone.

AMAZING! With Standard Attachments you need only **ONE INGERSOLL-RAND IMPACT TOOL** to do all operations.

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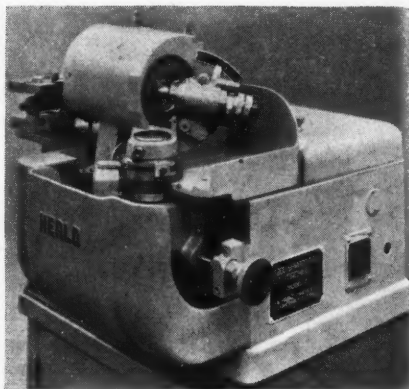
injection assembly can be easily removed and includes a Nitralloy piston and removable sleeve.

The machine is furnished complete with a motor, hydraulic oil, pyrometer control, gas equipment, and built-in hydraulic valve with adjustable cam core pulls.

Heald Model 2 Tool Sharpening Machine

Designed to produce a keen, sharp cutting edge, as well as proper shape, in grinding tools, the Heald Model 2 Tool Sharpening Machine illustrated herewith has been developed by The Heald Machine Co., Worcester 6, Mass. According to the manufacturer, the setting up and operation of the machine are easily accomplished and do not require a skilled operator.

When setting up for finish grinding on the fine-grit diamond wheel, the clearance and side angles, as well as the radius and center position, can be quickly and accurately set by direct reading scales. After the setup is made, the operator inserts the tool in a holder, flicks a switch, and the machine accurately generates the tool to the desired shape, blend-

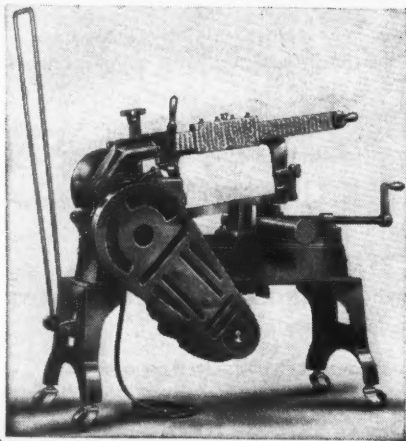


Heald Model 2 Tool Sharpening Machine

ing all of the angles and radius and producing a keen, flawless edge.

The design of the Heald Model 2 Tool Sharpening Machine includes provision for an extra wheel and free-hand grinding attachment on the left end of the machine where tools can be roughed out preliminary to generating the finished

SAWMASTER HACK SAW



LOW PRICED

PORTABLE
SELF-CONTAINED

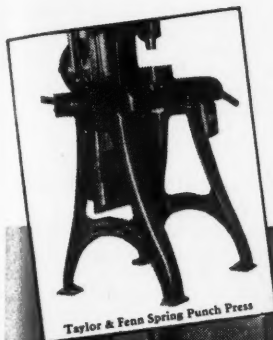
READY TO WORK

Angle
Cutting
Vise

STURDY
ECONOMICAL

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MILLER-KNUTH MFG. CO. OMAHA, NEB.



Taylor & Fenn Spring Punch Press

SWANK Eliminates Costly Floor Damage by Mounting Punch Presses on UNISORB

No Bolts • No Lag Screws • No Holes in Floors

Swank, Inc., manufacturers of distinctive jewelry and accessories for men, anchors punch presses and other vibrating equipment and machinery on UNISORB.

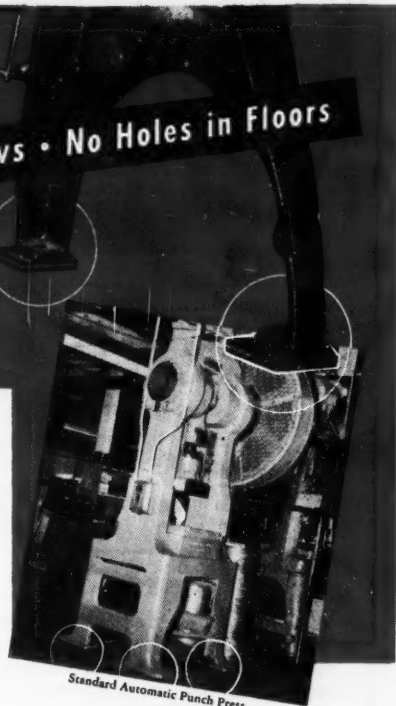
The hole-drilling and floor damage that go with bolt and lag screw mounting are thus eliminated... and another manufacturer's valuable floors protected by UNISORB Mounting.

This modern anchoring method is simple, quick and inexpensive. A special cement binds the UNISORB pads to the machine feet and the floor. Permanent set absolutely prevents any riding.

UNISORB absorbs from 60% to 85% of transmitted vibration and noise. This helps you save on machine repairs and building maintenance, helps you provide employees with quieter surroundings — and helps them work more efficiently.

Send for sample and complete specifications.

Writes Swank, Inc.: "We are satisfied users of UNISORB, which we are using for anchoring power presses, automatic stamps, foot presses, exhaust blowers, dryers, tubbing equipment and motors. We have applied UNISORB to wood and cement floors, and also to tile. We do not hesitate to recommend UNISORB for the uses to which we have put it."



Standard Automatic Punch Press



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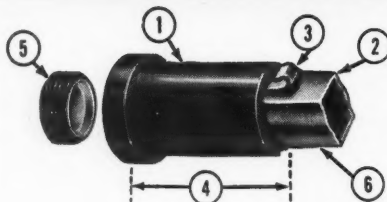
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3. Solder clip for easy assembly
4. Open dimensions to fit all requirements
5. Detachable cap
6. Ventilation area to reduce heat

"THE IDEAL EQUATION"

WE MAKE... a simplified brush holder that requires less material, assembly time, and labor... a product proven by over 10 years of wide use.

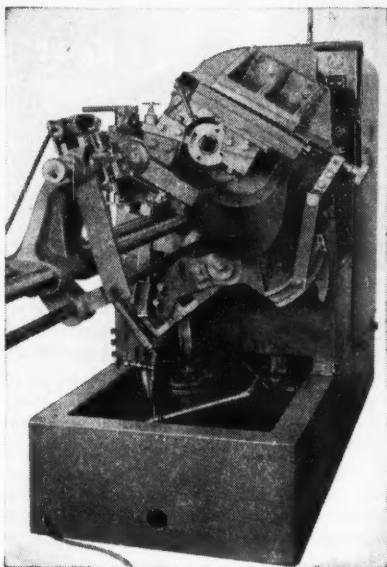
YOU GET... smooth brush action that insures lasting satisfactory performance. Practical—through complete range of sizes. Economical—through reduced all-around costs.

PHOENIX
ELECTRIC MFG. CO.
715 W. LAKE ST. CHICAGO 6, ILL.

shape on the right-hand side of the machine. The free-hand grinding attachment, being equipped with a swivel plate and protractor, is also suitable for finish grinding odd-shaped or extra large tools using a finishing wheel.

Modern Automatic Cutting-Off Machine

An automatic cutting-off machine for tubing, pipe, or solid bar stock is announced by The Modern Machine Tool Co., Jackson, Mich. The machine is said to be similar in design and to employ the



Modern Automatic Cutting-Off Machine

same efficient cycle as the manually-operated units manufactured by the company for some time, but is considerably heavier in construction.

The cross slides of the Modern Automatic Cutting-Off Machine are set at an angle to provide for maximum chip clearance. The double live roll stock feed of the unit is designed to feed any length of stock through the spindle and, as the stock strikes a trip plate on the stop, the automatic operating cycle of the machine is initiated. The complete cycle requires approximately $1\frac{1}{2}$ minutes, plus cutting

ment,
and
finish
tools

Off

for
an-
Tool
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CHAIN REACTION

VERY OFTEN a single industrial lubrication problem in your plant, if allowed to run unchecked, can set off a whole chain of costly production hold-ups.

Rust or corrosion, for example, frequently unnoticed in its insidious early stages, may soon affect a vital piece of equipment or machine. Then, suddenly, an entire production line is thrown out of balance.

Furnishing expert counsel and advice on rust and corrosion problems

is only one of the many ways Cities Service lubrication engineers can help you. These cost-conscious, production-minded experts are "professional worriers." Their recommendations for exactly the right grade of oils, greases, solvents or other petroleum products to meet your individual

needs are based upon "situation analysis" made on the spot and backed by experience.

Write Cities Service, Sixty Wall Tower, New York 5, N. Y. Room 40.



CITIES SERVICE Means GREAT Service

ALL THE WAY FROM THE REFINERY TO YOUR PLANT

time. The time required for changing set-ups on the automatic machine is said to be practically the same as on the manually operated units.

Electro-Mechano "Speed-Right" Flexible Shaft Machine

To meet the demand for a hand tool that will drive midget mills, rotary files, burs, drills and other carbon and high speed steel cutting tools at the correct cutting speed and maintain the proper r.p.m. under both load and no-load conditions, The Electro-Mechano Co., 261 E. Erie St. Milwaukee 2, Wis., has placed on the market the Electro-Mechano "Speed-Right" Flexible Shaft Machine shown herewith. Positive speed control is said to provide for reduced speeds while maintaining maximum motor torque. Any required r.p.m. can be instantly set at the finger-tip speed control lever. The speed range available is from 1,000 to 10,000 revolutions per minute.

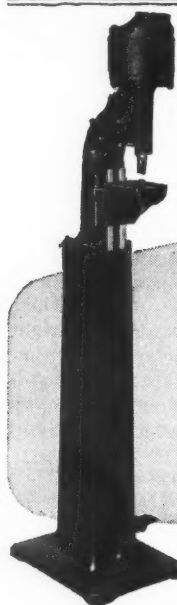
Once set, the proper cutting speed is said to remain constant without further adjustment regardless of whether the tool is cutting or idling. The result is even, uniform cutting and a tool that is smooth operating and steady on the work, it is



Electro-Mechano "Speed-Right" Flexible
Shaft Machine

claimed. Moreover, as a result of the proper cutting speeds provided by the machine, burning, chipping, and tool breakage are reduced to a minimum.

The Electro-Mechano Speed-Right Flexible Shaft Machine is powered by a 1/10 h.p. ball bearing motor. Speed control is



LINLEY

FOR NOISELESS, HIGH SPEED RIVETING

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models . . . sturdily built for trouble-free operation under severe production schedules.

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**LINLEY BROTHERS CO., 661 STATE ST. EXTENSION
BRIDGEPORT 1, CONNECTICUT**

AMAZING! INCONCEIVABLE! UNBELIEVABLE!

NEW PRE-SHARPENED SHEARCUTTER TOOL BIT

Actual photograph of a 3/8" SHEARCUTTER Tool Bit in production taking a finishing cut 1 1/8" deep under power feed. (3" Diameter C. R. S., 300 RPM, .005 Feed, Cutting Speed 240 FPM.)

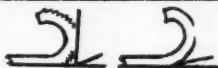


THIS AMAZING NEW INVENTION—

- Saves from 10% to 50% on labor costs.
- Increases production from 50% to 100%.
- Decreases power consumption from 30% to 70%.
- Takes extremely deep cuts with remarkable ease.
- Lasts from 3 to 5 times longer between regrinds paying for itself from savings in regrinding time alone.
- Generates less heat and saves on cutting compounds.
- Tends to sharpen itself automatically.
- Gives smoother finish and greater accuracy.
- Fits standard tool holders.
- Is interchangeable with less efficient tool bits.
- May be used on ferrous and non-ferrous metals, alloys and plastics.

YOU CANNOT AFFORD NOT TO USE THESE TOOL BITS!!

Watch for other
amazing
SHEARCUTTER TOOLS
soon to be
announced.



THE SHEARCUTTER PRINCIPLE
Illustrated at left is the conventional type of tool bit, breaking down or tearing the metal. At right: The slicing knife-like action of Shearcutter Tool Bits.

SHEARCUT TOOL CO.

Box 746, Dept. MM-28

Reseda, California

DISTRIBUTORS WANTED

February, 1948

MODERN MACHINE SHOP 221

provided by a centrifugal force electrical governor mounted in the motor case. A hanger bracket is provided for easy mounting of the machine, which is available with two types of rotary handpieces; namely, a ball bearing handpiece equipped with a No. 0 Jacobs chuck, and a sleeve bearing small diameter handpiece. Reciprocating handpieces for the use of Swiss pattern files are available.

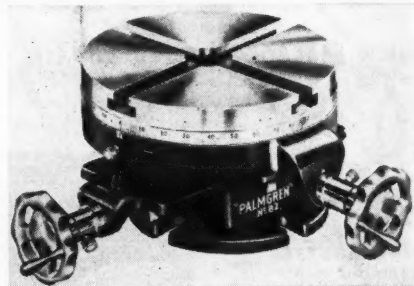
Palmgren No. 82 Indexing and Cross Slide Table

Identified as the Palmgren No. 82 an indexing and cross slide table with graduated rotary top is announced by the Chicago Tool & Engineering Co., 8399 S. Chicago Ave., Chicago 17, Ill. The table top is graduated a full 360 deg. and can be rotated manually and locked securely in any desired position.

The table is 8 inches in diameter and is provided with T-slots for the convenient mounting of parts and fixtures. The cross travel is effected by feed screws and accurately calibrated in thousandths of an inch. Adjustable gibs are provided for take-up due to wear.

A maximum cross travel of 4 inches,

plus the 360-deg. rotation of the 8-inch table top, is said to make the Palmgren No. 82 adaptable to many operations. The base includes four convenient bolt



Palmgren No. 82 Indexing and Cross Slide Table

and key slots for rigidly mounting to the table of a milling machine, drill press, shaper, or surface grinder. Materials used in the manufacture of the unit include semi-steel castings and bronze and steel, with the machining of all parts held to close tolerances.

For COMPACT Design

Specify

COMPACT DESIGN

HIGH TORQUE

HIGH-RATIO LEVERS

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LONG WEAR LIFE

EASY ADJUSTMENT

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MULTIPLE-DISC CLUTCHES

These compact, powerful, multiple-disc clutches are helping product engineers reduce size and weight between the driving and driven units of machine tools, lift trucks, overhead cranes and a wide variety of other equipment. Readily fit into product designs, accommodating great torque capacity within small size. Precision grinding insures perfect fit on the shaft.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



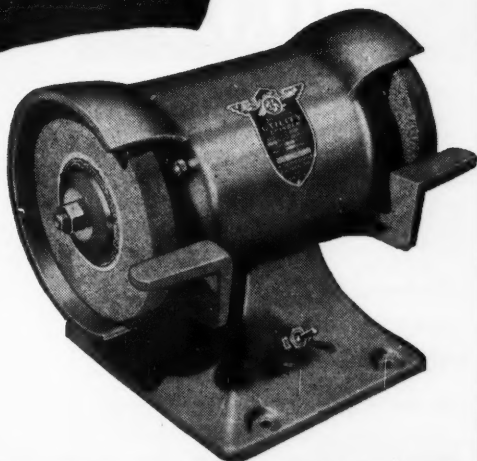
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300 Catherine Street, Rockford, Illinois, U. S. A.

Pullmore Clutches are sold by Morse Chain Co., offices in principal cities

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**UNITED STATES 6-INCH
UTILITY BENCH GRINDER**

**REDDY
for**

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- buffing
- wire brushing
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COMPACT . . . powerful . . . precision-engineered . . . precision-built. Sturdy construction . . . well balanced. Brilliant scarlet housing.

MOTOR: 1/3 hp, 3450 rpm, permanent split capacitor totally enclosed ball-bearing motor. **WHEELS:** 6" x 3/4" x 1/2"; one coarse and one fine. **TOOL**

RESTS adjustable to wheel wear.

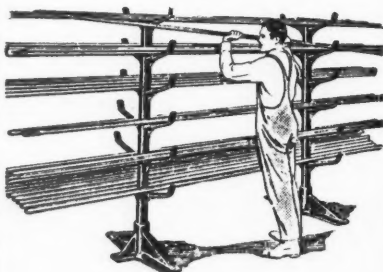
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The **UNITED STATES ELECTRICAL TOOL Co.**
CINCINNATI, OHIO



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard inter-locking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal thruout, depreciation is practically nil. SEND FOR BULLETIN 26-M.

BROWN SECTIONAL RACK

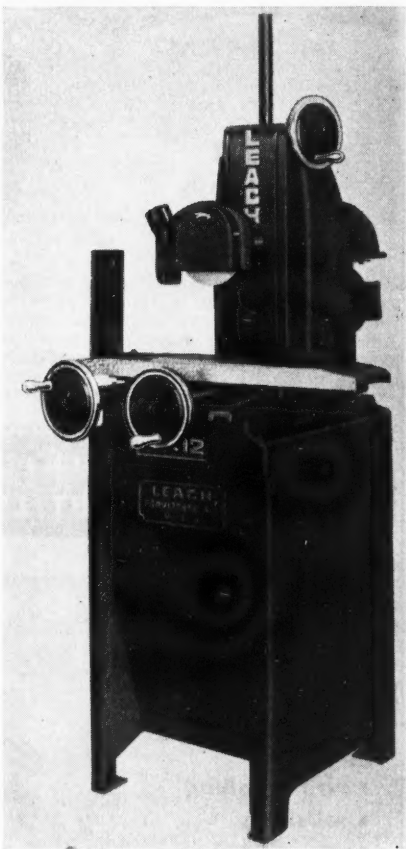
BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

Leach 6 x 12-Inch Surface Grinder

A streamline 6 x 12 x 10½-inch surface grinder of unusually compact design has been developed by the H. Leach Machinery Co., Providence, R. I. The machine is a self-contained unit with a two-speed ball bearing spindle, motor driven by a ¾ h.p. motor and completely equipped with dust guards.

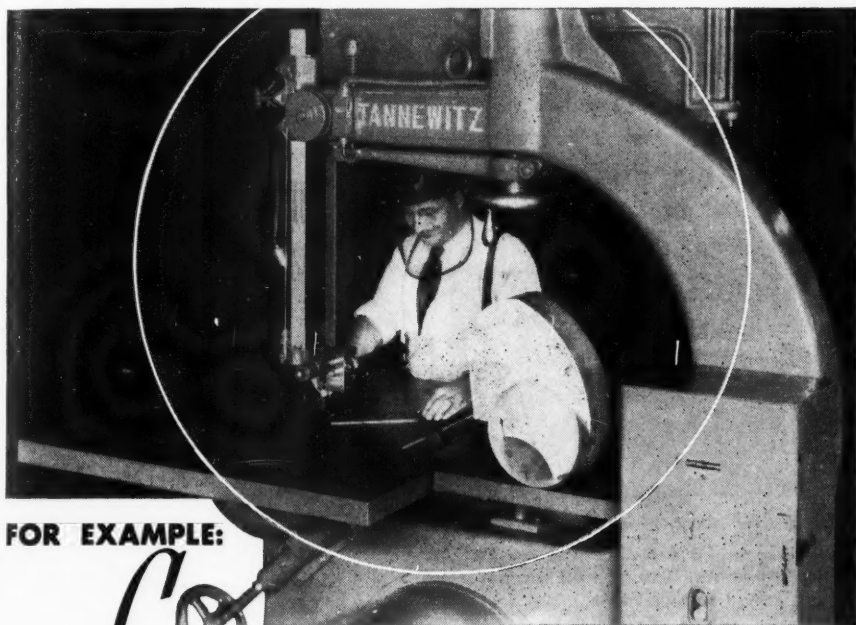


Leach 6 x 12-Inch Surface Grinder

Particularly recommended for machine, tool, and die shops, the Leach 6 x 12-Inch Surface Grinder when used with a standard 5 x 10-inch magnetic chuck, 7 x ½ x 1¼-inch wheel, and standard wheel adapter provides ample clearance room. The hand operating wheels of the ma-

FRICTION SAWING

solves thousands of Problems!



FOR EXAMPLE:

CUTTING side panels of a barometric damper as shown above. Cost of dies required for seven sizes would have approximated \$12,000 — a prohibitive sum for volume required on these sizes. Friction-sawn on a TANNEWITZ High Speed Band Saw in multiples of two in 1.2 minutes each — a very moderate cost which makes feasible the complete line required. Cost of machine was only a small fraction of cost of dies contemplated and it is also available for many other uses.

For trimming castings, formed parts, cutting metal as hard as a file and dozens of other operations, too, friction sawing with TANNEWITZ High Speed Band Saws offers tremendous advantage. Write for free booklet, "FRICTION SAWING."

THE TANNEWITZ WORKS

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chine are centrally located for ease of operation and maximum visibility.

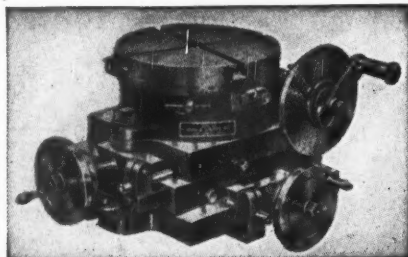
Wardwell No. 90FS Automatic Universal Flute Grinder

The Wardwell Manufacturing Co., 3166 Fulton Rd., Cleveland 9, Ohio, has announced an automatic universal flute grinder which is designed to grind spiral and straight flutes from solid in tools such as drills as small as $\frac{1}{16}$ inch in diameter, spiral or straight taper reamers, spiral or straight milling cutters and end

mills, and so on. Identified as the No. 90 FS, the machine can also be used in sharpening saws up to 12 inches in diameter and in gangs up to 7 $\frac{1}{2}$ inches long. On special order, the unit can be arranged for automatic milling.

The Wardwell No. 90FS Flute Grinder has a capacity for work up to 10 inches in

No. 1 COMPOUND TABLE With 7 $\frac{1}{2}$ " Dial Type Rotary Table Mounted



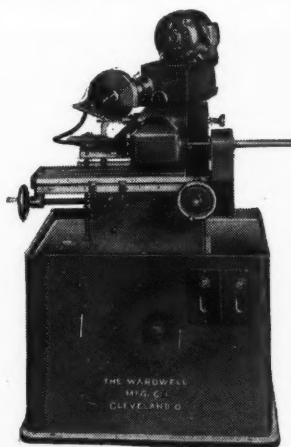
We also make a No. 2 Size for 12" Rotary Table. Can be had without Rotary Table.

Write for Bulletin.

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Machines • Screw Head Slotters.

John B. Stevens Inc.

482 Canal St. New York 13, N. Y.



Wardwell No. 90FS Automatic Universal Flute Grinder

diameter and a 9-inch table travel. The machine is equipped with an automatic locking device for the index plate. Spiral flute grinding is effected through a chain of gears located at the end of the work spindle and connected to the lead screw in the table slide. A spiral lead as short as $\frac{1}{8}$ to 1 turn can be obtained.

The Wardwell No. 90FS Flute Grinder is 68 inches high and occupies a floor space of 40 x 35 inches. The net weight of the unit is 1,265 pounds.

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

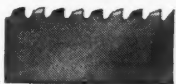
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One of the 4 is **EXACTLY RIGHT**
for your metal cutting...

DISSTON **BAND SAWS**



Regular type for normal high speed cutting.



Reinforced type for heavy-duty, high speed cutting.



Buttress tooth pattern for speeds of 3,000 f.p.m. and over.



Regular type for normal low speed cutting.

No matter what metals you cut nor at what speeds you operate, Disston has the right band saw blade to speed up your work, reduce down time and cut costs.

HARDENED THROUGHOUT

For high speed cutting of non-ferrous metals, plastics and many other materials. Two types (Regular and reinforced). Also recommended for friction cutting of ferrous metals at speeds of not less than 12,000 f.p.m. All sizes.

HARD EDGE, FLEXIBLE BACK

Hardened on tooth edge only for greater flexibility and longer life. Two types (Regular type for general metal cutting; Buttress tooth specially recommended for magnesium and aluminum alloys). All sizes. 100 ft. coils, 1/8" to 1/2", packed in the handy Disston Safety Reel.

ANOTHER COST-CUTTING TIP

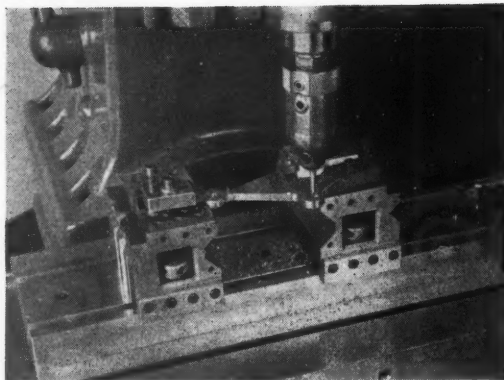
Use these Disston Metal-Cutting Tools:
FILES... HACK SAW BLADES... CIRCULAR SAWS... CARBOLOY FITTED CIRCULAR SAWS... TOOL BITS.



Order from your Disston Distributor,
or write direct for further particulars

HENRY DISSTON & SONS, INC., 221 Tacony, Philadelphia 35, Pa., U.S.A.

In Canada, write: 2-20 Fraser Ave., Toronto 1, Ont.



Hanson Holding Fixture

A holding fixture consisting of a base and two sliding mounting blocks, plus necessary clamps, screws, and so on, is now being marketed by Hanson & Co., 6527 Russell St., Detroit 11, Mich. Between each grinding operation performed in the construction of the fixture, the base and two sliding mounting blocks are stabilized through a "Deepfreeze" procedure

Hanson Holding Fixture

which is said to ensure the continuation of the guaranteed accuracy of the complete assembly and the elimination of the possibility of distortion. Accuracy of the complete assembly may be checked by an indicator, starting from any point of the base and indicating lengthwise or crosswise on the mounting blocks, through all of the seven vertical and horizontal vees, or across both of the square mounting shelves. According to the manufacturer, this indicating will show a guaranteed accuracy of 0.0002 inch on any plane

or point of the fixture, with this accuracy also applying to the squareness and parallelism in any direction, end to end, side to side, or up and down.

For general or specific toolroom application, the Hanson Holding Fixture may be installed on a jig borer or jig grinder. It is also adaptable to vertical mills, drill presses, profiling machines, slotters, and engraving and etching machines. More-

For ANY Size Machine

Chandler-Duplex

COMBINED Boring
and Facing Toolhead

**A Boring Head
That Won't Face
Is NOT Complete**

**NOW!
REDUCED
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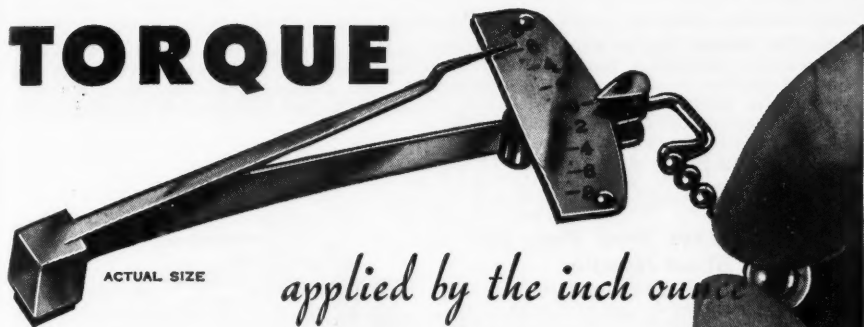
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STURTEVANT Torque Wrench

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BULLETIN 10-18

describing the STURTEVANT torque wrenches in capacities from 0-8 in. oz. to 7200 in. lbs. or 600 ft. lbs.

BULLETIN SW 18 describing the STURTEVANT "Sensory" (high speed production torque wrenches).

applied by the inch ounce

Minute or delicate threaded parts can now be correctly assembled, safely adjusted, or rigidly inspected by semi-skilled labor. With STURTEVANT Torque Wrenches, every operator has the same "master touch," tightens each thread exactly to the specified torque whether inch ounces or foot pounds.

STURTEVANT inch ounce TORQUE WRENCHES contribute materially to the uniform excellence of instruments, produced on a volume production basis. They can do much to assure the uniform excellence of your products because every STURTEVANT Torque Wrench is permanently accurate.

P.A. **Sturtevant Co.**
ADDISON **QUALITY** ILLINOIS

over, the fixture can be used for specific or general inspection purposes and for limited application in production and experimental work.

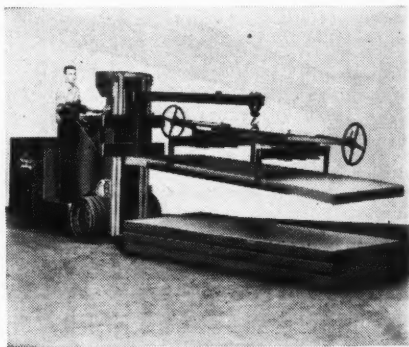
The design of the Hanson Holding Fixture is such that square, oblong, round, or irregular pieces may be accurately held.

Elwell-Parker Steel Plate and Sheet Handler

Especially designed for handling long sheets of steel in or out of freight cars, the Elwell-Parker Steel Plate and Sheet Handler illustrated herewith has been developed by The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio. The unit is constructed to handle a 3,000-lb. load of 8 x 4 feet or a 2,000-lb. load of 10 x 4 feet lengthwise, including the weight of the accessory, or a 6,000-lb. load of 8 x 4 feet or 10 x 4 feet crosswise the truck.

The truck has a forward and backward tilt, the latter for stabilizing the load when traveling since the rear end of the load rests against the uprights. The truck is furnished with telescoping uprights so that it may enter a boxcar and yet stack steel 6 to 10 feet high. One-inch dunnage

strips between unit loads are said to facilitate the insertion of the lifting lip of the suspended clamp-grab. The grab has a 24-inch adjustment for widths and



Elwell-Parker Steel Plate and Sheet Handler

is 84 inches long. The truck is designed to travel at a speed of 400 r.p.m. and to elevate at a speed of 12 to 22 feet per minute.



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Presses**

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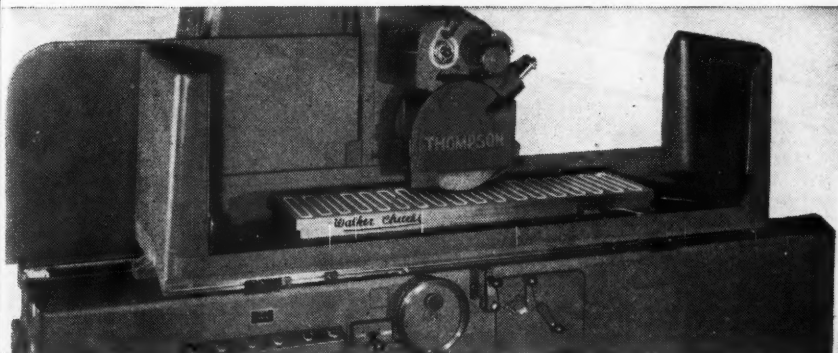
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The exacting demands of the Thompson Grinders are met by the holding power of the WALKER CHUCKS.

Sixty years of chuck design and manufacturing, qualify WALKERS to solve your holding problems.

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Halco Improved Universal Milling Machine Head

Designated as the "Speedmiller" and "Speedmiller Jr.," two improved models of the Halco Universal Head adaptable to milling machines and other types of machine tools in performing milling, boring, and profiling operations are announced by the Veet Manufacturing Co., 25757 Groesbeck, East Detroit, Mich. This firm has recently taken over the manufacture of the universal milling machine heads, collets, floating toolholders, form tools, and so on, formerly produced



Halco Improved Universal Milling Machine Head

by the Halco Products Co., Algonac, Michigan.

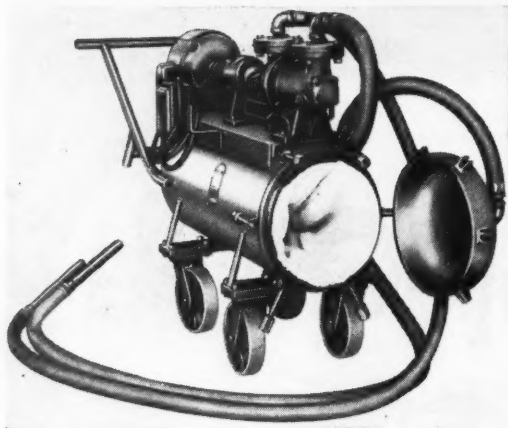
The heavy duty Speedmiller is designed to fit overarms from 3¼ to 5 inches in diameter and has V-ways with 4-inch vertical travel. It is supplied complete with a 110/220-volt single-phase motor. The Speedmiller Jr. is designed to fit overarms 2¼ to 3½ inches in diameter and utilizes the vertical travel of the milling machine to which it is applied. This model is also supplied with a 110/220-volt single-phase motor. Both models have full swivel in each direction and 6-speed drives. The Speedmiller has a No. 9 B&S taper spindle, while the Speedmiller Jr. has a No. 7 B&S taper spindle. The spindles of both models are equipped with duplex bearings.



**Economy Lubricant 1888
for grinding and cutting**

**Backed by sixty years'
leadership in quality lubricants
1888-1948**

THE WHITE & BAGLEY COMPANY
WORCESTER, MASS. • DETROIT, MICH.
Originators of Grinding Lubricants



Honan-Crane Coolant Filter

Honan-Crane Coolant Filter

The Honan-Crane Corp., 682 Wabash Ave., Lebanon, Ind., announces the addition to its line of oil and coolant clarification equipment of a mobile machine tool coolant filter which is said to offer effective filtration together with unusual simplicity of operation and ease of empty-

ing. The unit is mounted on four 8-inch caster wheels for maximum mobility. It is powered by its own motor and vacuum pump and operates on a continuous circulation arrangement from a suction hose through the filter tank and discharge hose. The flow rate is 12 gallons per minute.

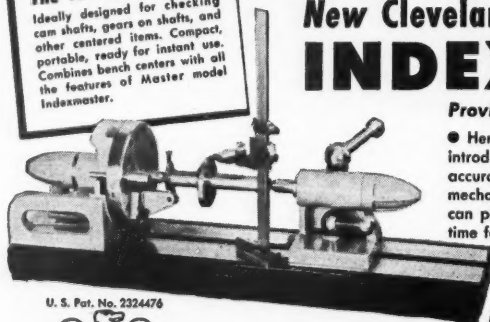
With the Honan-Crane Coolant Filter, coolant is processed in the machine sump, and the individual machine can be efficiently cleaned in an average of 10 minutes or less, it is claimed. Abrasives are prevented from entering the pump. The filtering medium consists of a close-woven cloth bag located within a perforated metal basket. Dirt and chips are held in the bag, which can be easily removed from the basket for emptying. The lid is a self-locking quick-opening type.

The entire unit can be easily tilted at a 45-deg. angle on the back wheels and auxiliary legs to facilitate emptying. The

Now A NEW ERA IN INSPECTION ...The Sine Bar is Dead!

The Universal Model

Ideally designed for checking cam shafts, gears on shafts, and other centered items. Compact, portable, ready for instant use. Combines bench centers with all the features of Master model Indexmaster.



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ELIMINATES THE SINE BAR in inspection • CHECKS angles with "Jo" Blocks • SPEEDS layout of cams, jigs, fixtures, gages, etc.

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WELDON *Cupped-End* end mills are stronger—eject chips better—last longer—out-perform any ordinary style end mill *two to one*.

The reason is that in making Weldon

end mills the emphasis is on quality, first, last and all the time. No expense is spared to insure the superior performance, strength and dependability of Weldon Tools. *Write for Catalog 8-B*

THE WELDON TOOL CO.

*Cleveland 4,
Ohio*



3000 WOODHILL ROAD

filter bag can be washed in a degreaser and reused. The only controls of the unit consist of starting and stopping switches.

Stow "Streamliner" Flexible Shaft Machine

The Stow "Streamliner" Flexible Shaft Machine as shown in the accompanying illustration is now being introduced by the Stow Manufacturing Co., Binghamton, N. Y. The motor and variable speed drive mechanism are both contained in a streamlined housing which covers all moving parts, eliminates all sharp corners and obstructions throughout the entire assembly, and shields the mechanism against accidental damage, while providing a clean and modern contour to the machine. The exterior of the unit is provided with a metallic blue lacquer finish.

The flexible shaft of the machine is driven by V-belt stepped pulleys. Speed changes and belt adjustment can be easily made by turning an eccentric spindle which is locked in position by a handy knob located on top of the housing. No wrench is required for this operation. The 6-foot flexible drive shaft is of standard Stow construction with an oil-resistant casing and coil reinforcement. Its ball-



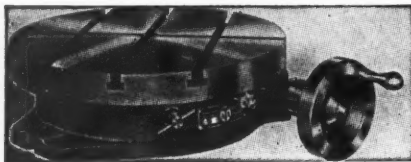
Stow "Streamliner" Flexible Shaft Machine

bearing handpiece is equipped with a detachable wheel arbor, thus providing for wide adaptability of tools and attachments.

Precision balancing of the operating mechanism on its yoke and pivot mounting is said to make the manipulation of the tool free-acting and safe. The ma-

BRAND NEW PRECISION

ROTARY TABLES



9"	\$ 97.00
12"	160.00
15"	185.00
18"	220.00
18"	350.00 Extra Heavy Duty
21"	500.00 Extra Heavy Duty
25"	590.00 Extra Heavy Duty

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Special Thread Taps & Dies. Left Hand Taps & Dies. Plug & Ring Thread Gages. Drills, Reamers, Milling Cutters, End Mills, Etc.

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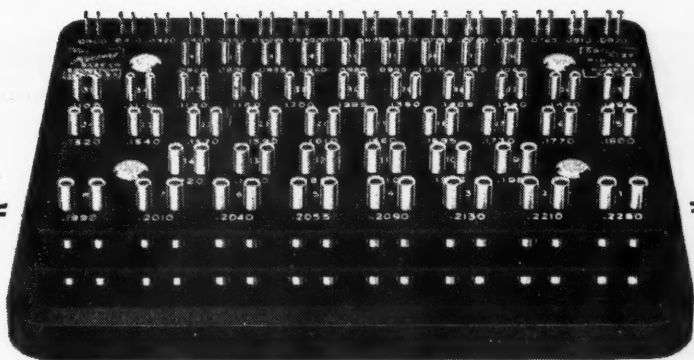
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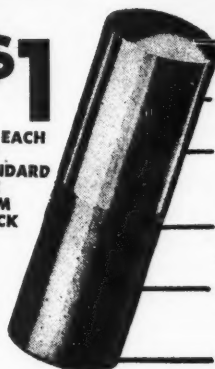
FRACTION SET—60
gages in 30 pairs in
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3/64" to 1/2". \$50 set.

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gages in 60 pairs from
1 to 60. \$90 set.

All sets include stands
... Prices F.O.B. Bridge-
port, Conn.

\$1

EACH
ANY
STANDARD
SIZE
FROM
STOCK



Polished Radius Top

TOLERANCE $\pm .0001$ —.0000

Overall Length 1 1/2"

LOWER HALF CONCENTRIC
TAPERED for easy insertion

Oil Hardened Tool Steel

Flat Ground Bottom

Sets in pairs of gages for checking any number of similar holes.
Stands have 3 plates and cover so that gages stand upright. Drill
size is plainly stamped in front of each gage hole, together with
decimal equivalent to the ten thousandth of an inch.

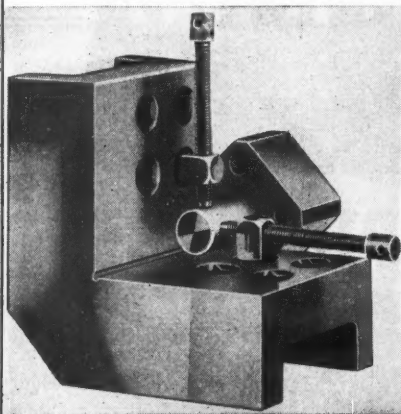
IMMEDIATE DELIVERY — 116 SIZES

Check or M.O. should include .08c postage for quantities less
than Set. Sets shipped Express Collect. No C.O.D.'s.

THE *Horberg* GAGE COMPANY

12 STAPLES STREET, BRIDGEPORT 1, CONN.

SQUAR-IT CLAMPING BLOCKS



Save costly set-ups in holding small work. All surfaces ground square with their opposite and right angle faces . . . to assure a perfect job on removal from block. Square sliding clamps are fitted to broached holes for easy removal. Furnished with two long and two short sliding clamps. Screws have knurled heads with hex broached hole in end for wrench tightening. Blocks furnished hard or soft . . . Model H-4 or S-4.

Write for folder.

Also manufacturers of Drilling Plates
and Radius Emery Wheel Dressers.

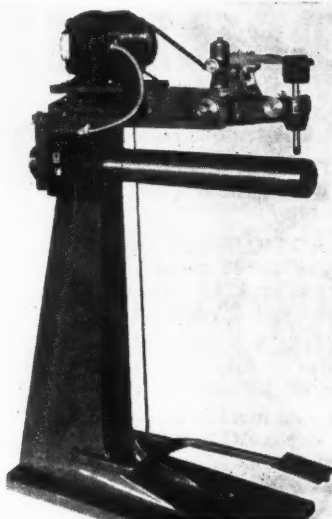
**TALLMAN TOOL
& MACHINE CORP.**

ROCHESTER • NEW YORK

chine is available in a pedestal type with $\frac{1}{2}$ h.p. motor; suspended type with $\frac{1}{4}$, $\frac{3}{8}$, or 1 h.p. motor; low-mount (pedestal) type with $\frac{3}{4}$ or 1 h.p. motor; or bench type with $\frac{1}{2}$ h.p. motor. Speeds for all $\frac{1}{2}$ h.p. types are 1,725, 2,700, 4,450, and 6,900 r.p.m. Speeds for $\frac{3}{4}$ and 1 h.p. types are 1,150, 2,100, 3,450, and 5,750 r.p.m.

"High-Speed" Riveting Hammer

The accompanying illustration shows a specially equipped riveting hammer which has been brought out by The High Speed Hammer Co., Inc., 313 Norton St., Rochester 5, N. Y. The machine includes



"High Speed" Riveting Hammer

a 24-inch long steel arbor and is said to be especially suited to sheet metal work.

While the unit shown has a capacity for rivets of from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, similar riveting hammers having greater or lesser capacity are available.

Ajax Isothermal Quench Furnace

For the cyclic annealing treatment of alloy steel forgings, the Ajax Electric Co., Inc., Frankford Ave. at Delaware Ave., Philadelphia 23, Pa., has developed

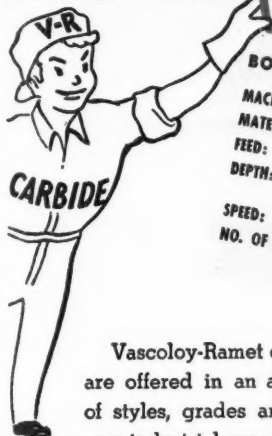
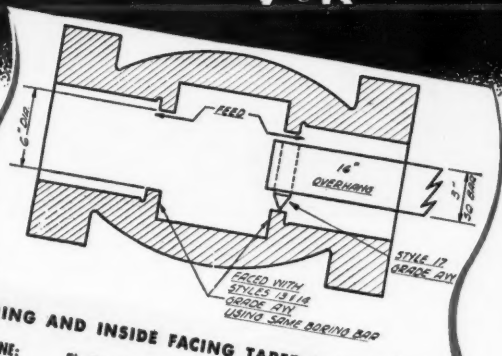
FROM

40 TO 1/2

PROVES

THERE IS NO SUBSTITUTE FOR V-R CARBIDE

Recently an eastern manufacturing concern had the unfortunate experience of having production drop from 40 to 1/2 piece per grind when circumstances forced substituting for V-R carbide.



BORING AND INSIDE FACING TAPER SEAT VALVES

MACHINE: Flatner Engine Lathe
MATERIAL: Tough Cast Iron
FEED: 3/32" per Revolution on Bore
DEPTH: On Bore — 3/16" to 1/4" on a Side (as much as 3/8" due to castings being non-concentric)
SPEED: 100 S.F.M.
NO. OF PIECES: 40 Pieces Between Grinds with V-R Grade AW
 Less Than 1/2 Piece with Substitute

Vascoloy-Ramet carbide tools and blanks are offered in an almost unlimited choice of styles, grades and dimensions to meet any industrial requirement.

Call or write your nearest V-R Field Engineer and obtain the courteous, experienced service that has earned V-R its enviable reputation of "Maker of the World's Finest Carbides."

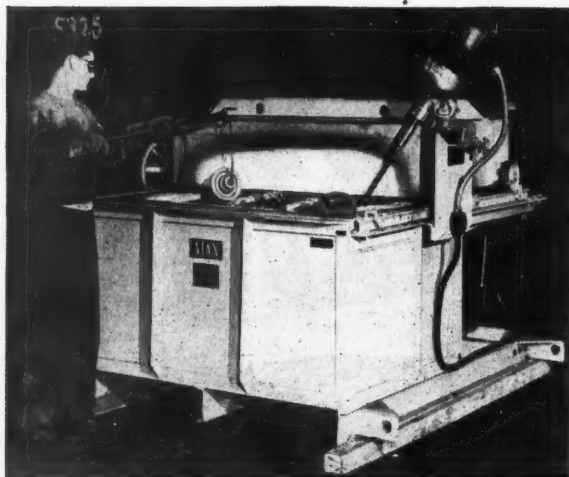
SEND for your copy of the NEW V-R 400 Carbide Tool and Blank Catalog. 32 pages of vital carbide engineering data. Address Dept. TE-247.



VASCOLOY-RAMET CORPORATION

NORTH CHICAGO ILLINOIS, U. S. A.
 District Sales and Service in Principal Cities

An affiliate of Insteel Metallurgical Corporation and Vanadium Alloys Steel Company



**Ajax Isothermal Quench
Furnace**

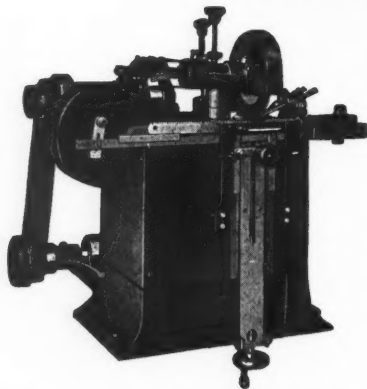
sub - critical transformation temperature for the particular steel where it remains for a sufficient time (indicated by the "S" curve for the particular steel) to permit complete transformation to occur, after which the forging may be removed and cooled. This method is not only said to provide for the annealing of forgings with extreme uniformity but to also remove all traces of scale. The entire process is claimed to require only 10 to 60 minutes. The degree of annealing can be controlled within very close limits so as

the Ajax Isothermal Quench Furnace shown in the accompanying illustration. Utilizing its residual heat as it comes directly from the press, the forging is introduced into a salt bath operating at the

to produce a structure offering optimum machining qualities.

Since the residual heat of the forging must be extracted rapidly to assure the absolute uniformity and accuracy of the

More Metal cut per blade ...when blade is sharpened with E. C.



Properly sharpened metal cutting saws last longer. In fact E.C. Combination Metal Cutting Circular, Hack and Band Saw Grinder has demonstrated it can pay for itself within a year by the savings on blades alone.

Blades not only last longer, but cut cleaner and faster with minimum destructive effect on teeth. Write for Bulletin E.C.

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ASTE Machine Tool Exhibit

THE WARDWELL MANUFACTURING CO.
3166 Fulton Rd., Cleveland 9, Ohio

Why take a chance..



You can tell at a glance

...with **P-K** SIZE MARK

*REG. U. S. PAT. OFF.



SOCKET HEAD CAP SCREWS

U. S. PAT. NO. 126,409

ONE QUICK GLANCE tells you the size of a P-K Size-Marked Gear Grip Socket Head Cap Screw. No need to "mike" or gauge it... no chance for error! New workers learn faster—can work faster. Servicing and repair work on your product is simpler and easier.

GEAR GRIP prevents slipping and fumbling, speeds assembly, especially when busy hands are oily.

EVEN EXPERIENCED MEN need the Size-Mark, because tests show that many guess wrong on size and thread pitch. That means time out to find out.

LET THIS DOUBLE FEATURE—the Size-Mark and Gear Grip—save you time and trouble. Only P-K offers both in Socket Head Cap Screws. Ask for samples. Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.

AVAILABLE FOR PROMPT DELIVERY

PARKER-KALON  **SOCKET SCREWS**

SOLD ONLY THROUGH

ACCREDITED DISTRIBUTORS



OTHER PARKER-KALON PRODUCTS

SELF-TAPPING SCREWS • HARDENED SCREWNAILS AND MASONRY NAILS • SHUR-GRIP FILE AND SOLDER IRON HANDLES • METAL PUNCHES • DAMPER REGULATORS AND ACCESSORIES

cyclic annealing treatment, the Ajax Isothermal Quench Furnace has been especially designed for the process. The use of a motor-operated mechanical agitator is said to eliminate temperature build-up in the bath while maintaining it at a constant temperature, and provides a uniform and maximum quenching speed to each individual piece of work introduced into the bath.

Revolvator "Go-Getter" Power Lift Truck

A walk-along power lift truck known as the "Go-Getter" is now being produced by the Revolvator Co., North Bergen, N. J. Self-contained but with adjustments readily accessible, the truck is claimed to be unusually powerful for its diminutive, handy size—27½ inches between the control handle and the back of the battery box. The design of the unit includes a single package hydraulic lift unit on which all adjustments can be made from the outside. To simplify maintenance or repairs, the hydraulic or power unit can be easily removed from the truck body.

The Revolvator Go-Getter Truck is available in 4,000 and 6,000-lb. capacities, heights, of 7, 9, and 11 inches and lengths

of 36, 48, 54, 60, and 72 inches and over, with 26½-inch width. The platform can be raised a full 4 inches. Under certain conditions, the truck can also be obtained



Revolvator "Go-Getter" Power Lift Truck

in a 6-inch height. An underclearance of 3½ inches is said to eliminate hanging of the truck on ramps or aprons.

The Go-Getter operates on a 6-cell 13-plate battery which is said to provide for normal 8-hour operation. The front wheels of the truck are 12 x 3½-inch dual units with demountable rubber tires. The truck is supplied complete with a lockable control and horn.

DRILL JIG BUSHINGS

A

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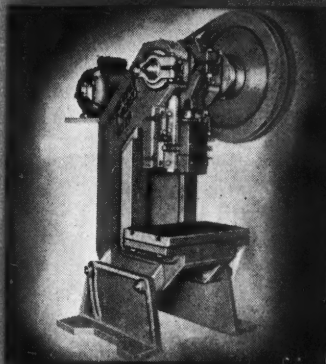
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FOR
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212 N. LAFLIN STREET, CHICAGO 7, ILLINOIS

Rousselle

PUNCH PRESSES

5 & 10 TON CAPACITY
BENCH PRESSES

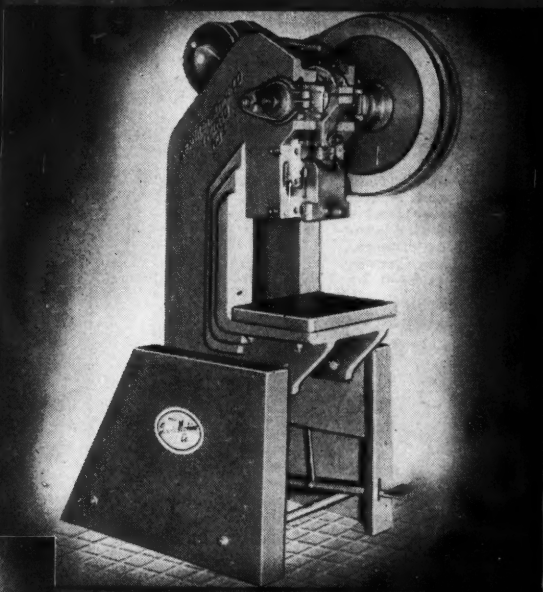


These Presses were designed to provide strength, accuracy, speed and endurance.

These models will handle any requirements within their capacities for stamping, blanking, forming and any other high speed operations.

5, 10, 15, &
25 TON O.B.I.
FLOOR MODELS

These new A series Presses have been developed due to the demand for a better and ordinary Bench Press, and retain all the sturdy characteristics of their predecessors with added safety, speed, strength and ease of operation and maintenance.

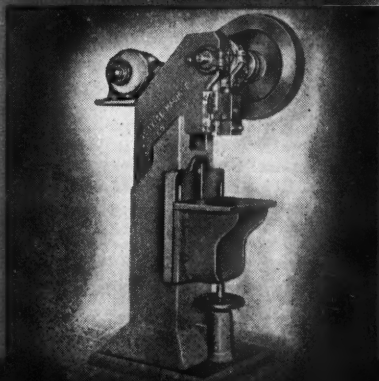


15 TON
HORN PRESS

This Press is performing a wider variety of jobs which until recently were not thought of as Press operations.

The predominant feature is the adjustable bed which can be raised or lowered to the required die space.

The bed can be easily removed for the use of heating dies.

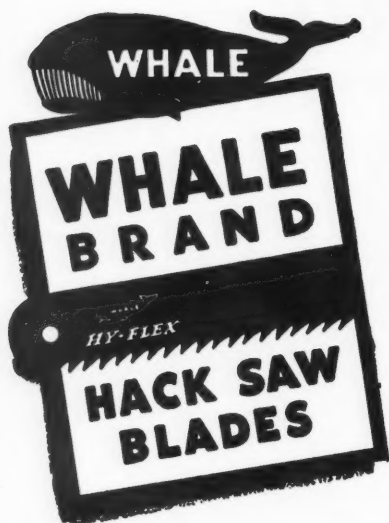


MFRS.
OF
Rousselle
PUNCH
PRESSES

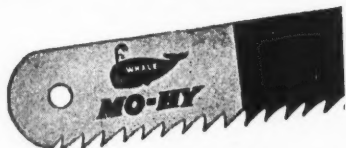
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SERVICE MACHINE CO.

7533 S. ASHLAND AVE. CHICAGO, ILL.



Every Forsberg Blade bears the famous WHALE BRAND mark of quality. Scientific heat treating and thorough check every step of the way, plus a severe bending pounds test gives Forsberg Blades superior performance. The popular HY-FLEX Blade meets today's demand for extreme flexibility at medium price—it has the guts for solid service.



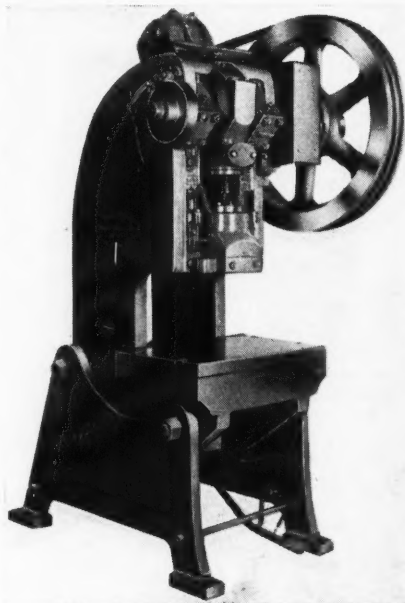
A Whale of a Blade—MO-HY'S special molybdenum steel gives unusual cutting service—same speed as tungsten with comparable performance. For outstanding results on stubborn jobs, ask your mill supply house for WHALE BRAND HY-FLEX and MO-HY BLADES.

Get to know the satisfaction in
 • Whale Brand Hack Saw
 Blades and Frames • Bond
 Saws • Coping Saw Frames
 and Blades • Screw Drivers
 • Hand Drills.

Forsberg
 MFG. CO., BRIDGEPORT, CONN., U.S.A.

Superior Steel-Welded Punch Press

The Superior Punch Press Co., 3610 Superior Ave., Cleveland, Ohio, has brought out a steel-welded punch press in 70 and 100-ton capacities. An outstanding feature of the press is a brake which is applied only at the moment of clutch disengagement. The brake is self-energizing; therefore, the braking action increases in pressure until the crankshaft reaches zero speed. The brake action is synchronized with the clutch so that when the clutch engages, the brake disengages



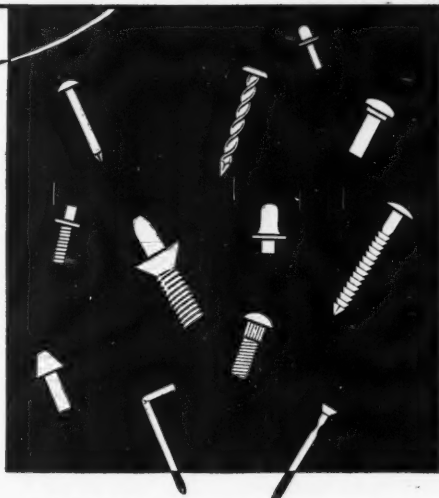
Superior Steel-Welded Punch Press

and remains free while the press is in motion.

The clutch is cam controlled. No pins are used since the cam is mounted on the crankshaft which works the throw-out yokes, thereby resulting in a positive clutch action. With this arrangement, the wear on all clutch parts is said to be reduced to a minimum. The 70-ton press main bearings are 4½-inch units and the connection bearing is a 6-inch unit. The standard stroke of the press is 3½ inches, with longer strokes available on order. The bolster plate measures 22 x 32 inches.

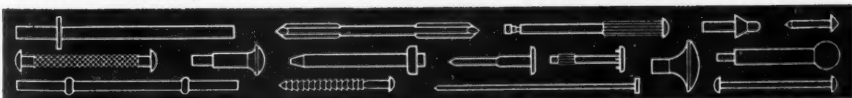


special nails • rivets • screws • made to your order



HASSALL cold-heading may solve your immediate special part problem . . . Special nails, rivets and threaded parts made in diameters from $1/32$ " to $3/8$ "—lengths up to 6" . . . Rivets $3/32$ " diameter and smaller a specialty . . . Variety of metals, finishes and secondary operations . . . Economy, quality and quick delivery in large or small quantities . . . Tell us what you need . . . We will answer promptly. **ASK FOR FREE CATALOG.** 3-color Decimal Equivalents Wall Chart free on request.

JOHN HASSALL, INC. • 394 OAKLAND STREET, BROOKLYN 22, N. Y.



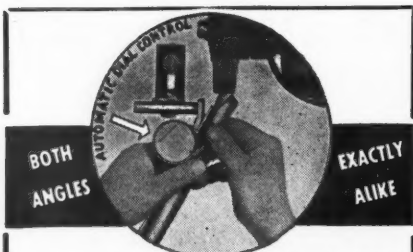
MANUFACTURERS OF COLD-HEADED SPECIALTIES—ESTABLISHED 1850

Westinghouse RF Metal-Working Generator

Designed specifically to meet the demands of the metal-working industry, a 20 kw. 450 kc. radio frequency generator now being built by the Westinghouse Industrial Electronics Division, Plant No. 4, Baltimore, Md., consolidates a generator, work table or sink, current transformers, and water fittings into one easily installed simple-to-operate unit requiring minimum floor space.

The generator is available in three types designated as A, B, and C. The

Type A is a single-position unit with built-in work table and transite table top especially suited to brazing and soldering. The Type B is a single-position unit for hardening applications with a built-in work sink, two sets of water fittings, and a current transformer. The Type C is a versatile two-position unit suited to many soldering, brazing, and hardening applications that combines a built-in work sink, two sets of coil and quench water fittings, and two current transformers with automatic transfer switch to provide



with MAJESTIC DRILL SHARPENER

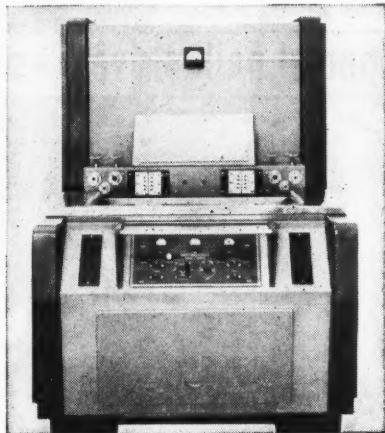
Now you can always have perfectly sharpened, fast-cutting drills that really take the proper bite and cut smoothly without chatter. Simply turn the Automatic Dial Control, and the Majestic Drill Sharpener is set to grind both cutting edges and both angles exactly alike. Takes any size drill from 5/32" to 1", straight or No. 2 taper shank. Fits any grinder. Adjustable for hard or soft materials. The Majestic Drill Sharpener is a real production tool that assures longer drill life, speeds up the work and quickly saves its cost in factories, garages and repair shops. Price \$9.50 F.O.B. Factory, ask your supply house, or order direct. Many thousands in use. Circular on request.

Dealers, Jobbers: Write for Information.

MAJESTIC DRILL SHARPENER CO.

1337 S. 6th St.,

Minneapolis 2, Minn.



Westinghouse Type C Metal-Working R.F. Generator

two independently controlled work positions.

According to the manufacturer, stepless power output control of from 0 to 20 kw. provides for unusual operating flexibility in the generator and ensures uniform performance on repetitive setups.



SCHULTZ & ANDERSON
dowel pins



Immediate Delivery!

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

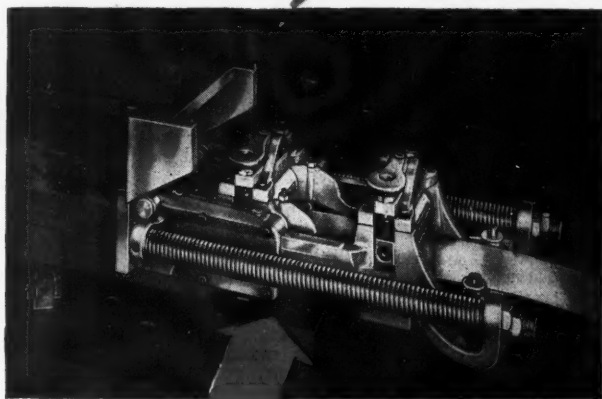
Dealer inquiries invited.

SCHULTZ & ANDERSON CO.

111 EDISON PLACE NEWARK 5, N. J.

Still Wasting Time

FEEDING
PUNCH
PRESSES
BY
HAND



● **Increase Your Production**

at least 300% with

DICKERMAN DIE FEEDS

*Write
Today!*
**For this new
Catalog**



Here is a dependable accurate die feed that reduces operator hours 80 to 90% . . . and increases production 300% or more.

Completely automatic, it "takes over" all hand operations. It is speedy and efficient . . . tough and rugged . . . with no wearing parts to get out of order. It is flexible enough to feed stock from any angle . . . versatile enough to easily feed *any* punch press. There are advantages to be gained even on short runs of 5000 pieces.

Start saving time and increasing production at once. A Dickerman Die Feed pays for itself in a short while.

H. E. DICKERMAN MFG. CO.

322- 26 ALBANY STREET • SPRINGFIELD, MASS.

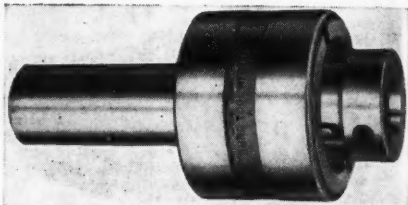
For easy mounting of various work-handling equipment, the 12-inch deep sink is equipped with 8 tapped bosses, and extra space is provided below the sink for handling mechanisms. Built-in plug-type outlets at work positions provide 230-volt power for work-handling equipment motors and for hand or foot control of both quench and heat. Heavy duty tapped r.f. output terminal plugs are said to ensure a rigid mounting for the work coils.

"Tool-Flex" Neoprene Mounted Flexible Toolholder

The Burg Tool Manufacturing Co., Dept. MMS, 5028 W. Jefferson Blvd., Los Angeles 16, Calif., announces the addition to its line of "Tool-Flex" toolholders of a non-releasing pull-out type flexible toolholder for tapping on screw machines which features a Neoprene mounting that is said to prevent binding, absorb shock, maintain taps on center, and permit them to follow the drilled hole, thus simplifying setup, preventing tap breakage due to misalignment, and assuring the production of accurate threads from one piece

to the next, it is claimed. The pull-out action of the holder compensates for the difference in cam motion and tap travel when backing the tap out of the material so as to prevent tap breakage and torn threads.

According to the manufacturer, the Tool-Flex Neoprene Mounted Flexible



"Tool-Flex" Neoprene Mounted Flexible Toolholder

Toolholder includes no parts which are subject to wear, thus ensuring long and accurate life of the unit. The holder is made of alloy steel which is heat treated and ground to close tolerances. In the smaller sizes, the holder has a short overhang, thus making it ideal for small clearance machines.



Order Them Together

STITES CAMS AND TOOLS

for Screw Machine Products

One source of supply and responsibility for your Brown & Sharpe cams and circular form tools is a definite advantage.

This is available at the Stites Tool Company where years of experience assures quality, accuracy and prompt service.

Here's one more priceless ingredient—Personal Service. Ask any Stites customer or better yet, try it yourself.

STITES

THE STITES TOOL CO.

1426 W. THIRD STREET • CLEVELAND 13, OHIO

PRODUCTION INCREASED

1/3



**REPORTS THE
MAST-FOOS
MFG. CO.,**

by cold riveting their lawnmower reel blades to the reel heads on FLEXIBLE-POWER PRESSES.

This is possible because the operator controls the length of every ram stroke and the pressure exerted—from a few pounds to capacity—by one foot pedal. *Both Hands Are Free To Handle the Blades.*

Compression riveting on FLEXIBLE-POWER PRESSES is faster. The metal has time to completely fill each rivet hole, and to form a smooth tight button head that will not crystallize and break off.

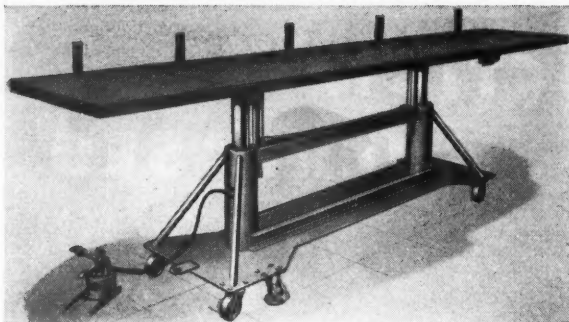
Flexible-Power Presses are also working in most production plants on Straightening, Push Broaching, and other pressing operations. Capacities —3 to 75 tons. Quickly installed, easy to operate, maintenance is nil.

Write for Bulletin 376.

GENERAL MANUFACTURING CO.

6430 FARNSWORTH AVE. • DETROIT 11, MICHIGAN

3167



Lyon-Raymond Double Pedestal Hydraulic Sheet Feeding Table

A hydraulic sheet feeding table of synchronized dual pedestal design is now being offered in capacities of 4,000 and 6,000 lb. by the Lyon-Raymond Corp., 4384 Madison St., Greene, N. Y. The construction of the table includes a standard size base on which tops of various widths to accommodate the desired sizes of sheets or strips may be fastened. A 30-deg. tilt top is offered as optional equipment.

Lyon-Raymond Double Pedestal Hydraulic Sheet Feeding Table

A single-speed hydraulic foot pump with 5 feet of flexible hose enables the operator to conveniently increase the table elevation from 24 to 36 inches without moving from his normal press feeding position. The table is equipped with two heavy duty swivel casters and two heavy duty rigid casters.

A floor lock holds the table in the required feeding position.

Hobart Model TIH-300-s A.C. Welder

The Hobart Brothers Co., Hobart Square, Troy, Ohio, announces an a.c. welder especially designed for use with "Heliarc" equipment employing helium or argon for the inert-gas-shielded welding of magnesium alloys, aluminum, stainless steels,

WILLEY'S DIAMOND DRESSERS

NATURAL WHOLE DIAMONDS Set in WILLEY'S METAL



Willey's Diamond Dressers can be adapted to all makes of grinders, for rough, semi-finish and finished dressing for grinding hardened parts requiring a precision ground finish.

A trial will convince you there is no wheel dressing tool on the market, costing two or three times the price, that will equal its performance and cost per dressing.

WRITE FOR CATALOG 42—Illustrates complete line of Willey's Diamond Tools and Mechanical Dressers.

No.	Usable Contents of the Diamonds		QUANTITY PRICES				Wheel Diameter
	Diameter	Length	1-25	26-50	51-75	76-100	
W-3	5/16	5/16	\$11.00	\$10.00	\$ 9.00	\$ 8.00	6 to 12
W-4	11/32	3/8	13.00	12.00	11.00	10.00	12 to 20
W-5	3/8	13/32	15.00	14.00	13.00	12.00	20 to 24
W-6	7/16	7/16	17.00	16.00	15.00	14.00	24 to 42

WILLEY'S CARBIDE TOOL CO.

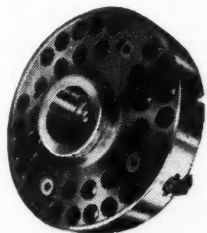
SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

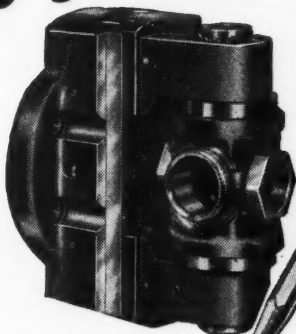
Detroit 1, Michigan

Visit us at Booth 118, Cleveland, March 15-19

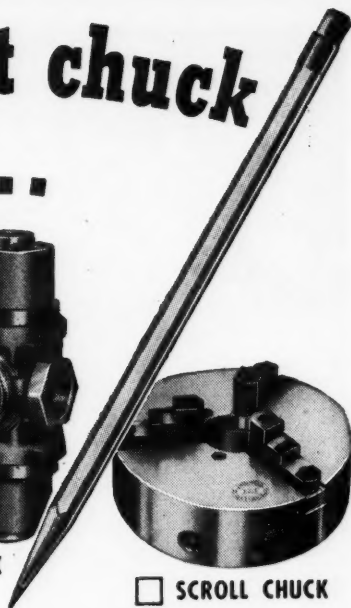
Pick the right chuck
for the Job...



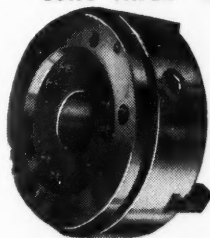
☐ INDEPENDENT CHUCK
LONG TAPER "L" TYPE



☐ INDEXING CHUCK

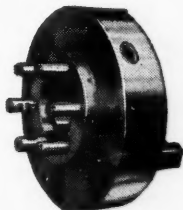


☐ SCROLL CHUCK



☐ TAPER SEAT
CHUCK A1

**UNION
CHUCKS**



☐ CAM LOCK
CHUCK

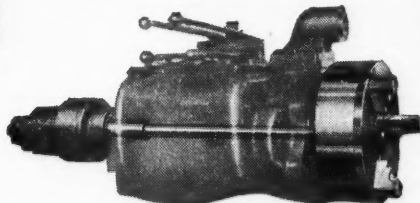
The broadest line of Chucks in the world

UNION MANUFACTURING CO.

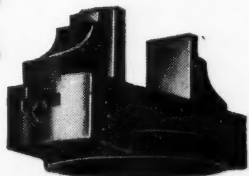
306 Church St., New Britain, Conn.



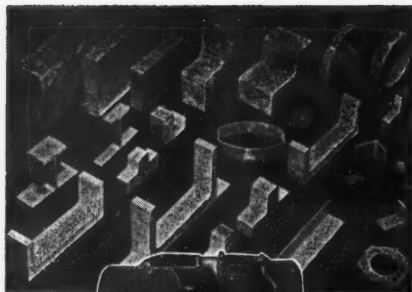
☐ DRILL
CHUCK



☐ POWER OPERATED CHUCK



☐ TWO JAW CHUCK



CUTS METAL FASTER *More Accurately*

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD.
2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

high carbon and other alloy steels, brass, and other hard-to-weld metals.

Designated as the Model TIH-300-s, the welder embodies high frequency stabilization to ensure easy starting and dependable maintenance of the gas-shielded arc with practically no rectification of the alternating current passing through it. In this manner, sound welds of clean appearance are said to be ensured and the amount of current drawn from the power lines by the transformer reduced. The design includes a window through which the spark gap may be observed and a door through which it may be reached for adjustment.

Pressure on the convenient foot pedal



Hobart Model TIH-300-s A.C. Welder

of the welder instantly starts the arc through the tungsten electrode and simultaneously opens valves which permit the shielding gas and the cooling water to flow through the special torch. Release of the pedal breaks the arc but permits the gas and water to continue flowing for a predetermined length of time, which is adjustable up to 180 seconds. This delaying action protects the weld metal from oxidation until it has had time to solidify after the arc has been broken. A strainer located in the water line ahead of the valve is accessible for cleaning.

cut production costs with a **SHOPLIFTER**

- **Light, Compact**
- **Easily Moved About**
- **One-Man Operated**
- **Wide Range in Application**
- **Saves Production Time**
in handling dies and heavy fixtures; stacking barrels, boxes, etc.; loading and unloading trucks

Specifications

Type—D

Capacity—500 lbs.

Overall height—72"

Platform lift—54" above floor level, lowers to within 5" of floor

Baseframe—24" wide x 33" long

Platform—24" x 24", steel plate

Entire frame of machine of structural steel, electrically arc welded throughout

Basewheels—4" diameter, iron wheels

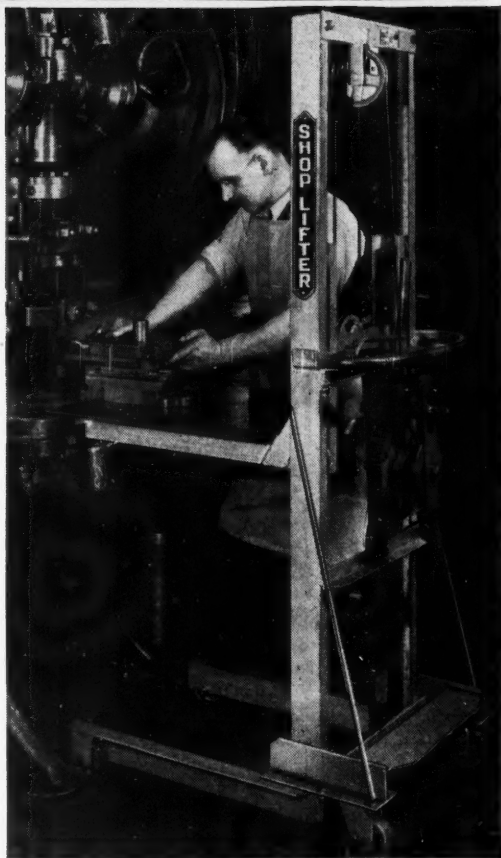
Crank up and down hoist unit

Two swivel casters and two stationary wheels with push bar furnished

Painted olive green finish

Weight—250 lbs. (approx.)

Heavier capacities up to 5,000 lbs. also available. Write for details.



Prompt Delivery

Price \$157.50. Full Freight Allowed... Foot Operated Floor Lock, \$10.00 Extra

2637 West Van Buren Street, Chicago 12, Illinois

ECONOMY ENGINEERING CO.

Pearson Precision Micrometer Lapping Fixture and Comparator

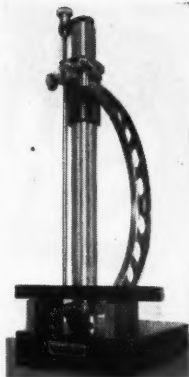
Product of the Red Wing Motor Co., Red Wing, Minn., the Pearson Precision Micrometer Lapping Fixture and Comparator shown herewith is a unit in which a micrometer ranging from 1 to 18 inches in size, or the spindle thereof, may be firmly clamped for the purpose of correctly lapping the micrometer anvil and the end of the micrometer spindle. The device is also applicable to the lapping of precision end measuring rods, as well as

rectangular blocks and gages.

The purposes of the fixture are first to correctly position a micrometer or its spindle and correctly support a lap in the operation described above; secondly, to firmly clamp a micrometer or spindle in such a position; and thirdly, to afford facilities for the proper adjustment between the lap and the work being lapped without disturbing the relative alignment of either. Fixtures with longer columns for micrometers larger than 18 inches can also be furnished. When desired, the fixture can be used as a comparator by mounting an indicator in the V-block supplied with the unit.

Lapping of the micrometer anvil and end of the spindle is accomplished by movement of a cast iron lapping bar, which is charged with No. 180 grit lapping compound. The lapping compound does not reach the parallels but only the point being lapped, a surface of about 2 inches in length by the width of the bar, which is $1\frac{1}{2}$ inches. When the bar is worn out of true, it is surface ground again to bring it back in condition.

The lower support is floating so that when the feed screw at the top is used, the anvil raises up to the lapping bar. The micrometer sleeve is supported in a hardened and ground V-block which lines up the micrometer frame and anvil to



Pearson Precision Micrometer Lapping Fixture and Comparator

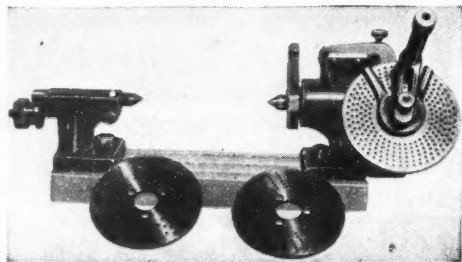
BAUMBACH

THE DIE SET AUTHORITY



All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.
1806 S. KILBOURN AVE. CHICAGO 23, ILL.



6" PLAIN DIVIDING HEAD

Spindle has No. 7 B & S taper and take-up collar for end thrust. Plates cover entire range of B & S chart. Complete with 3 dividing plates 4" dia., one 24-notch indexing plate (not supplied with other makes of 6" heads) and tailstock. Write for folder of machines and attachments.

Immediate shipment from stock

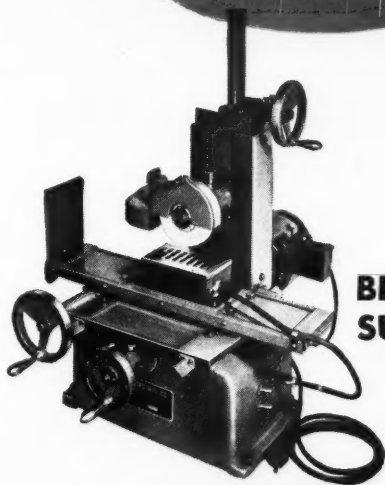
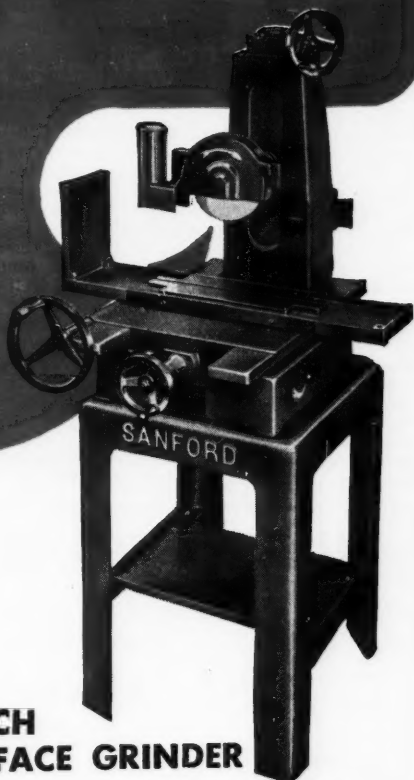
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702 West 4th St., Cincinnati 3, Ohio

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SURFACE GRINDERS

Model MG

Handles many odd size tool room and production jobs, due to its capacity of 8" x 12" x 12". Actual movements — Transverse 8¾" — Longitudinal 13" — Vertical 12" (under 7" wheel).



BENCH SURFACE GRINDER

Model SG

A sensitive, highly accurate machine specially designed "for the job that fits in your palm." Actual movements — Transverse 4" — Longitudinal 8" — Vertical 6" (under 4" wheel).

WRITE FOR COMPLETE DETAILS

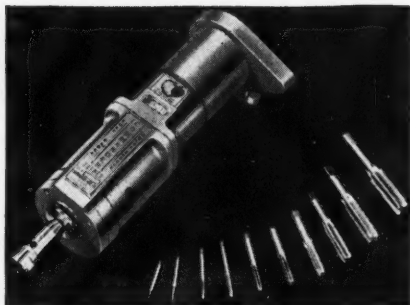
SANFORD MANUFACTURING CO.
1021 COMMERCE AVENUE
UNION, NEW JERSEY

its proper location. The spindle of the micrometer is removed and also placed in the same V-block. When the anvil is worn, it is necessary to readjust the micrometer after operations are completed.

Commander Tapper

A unique tapping head which is designed to fit practically any drill press and is said to handle taps from No. 0 to $\frac{3}{4}$ inch has been announced by the Commander Manufacturing Co., 4224 W. Kinzie St., Chicago 24, Ill. The tapper employs a spring clutch drive and adjustable torque control which are claimed to provide for extreme sensitivity, together with a wide range of adaptability.

According to the manufacturer, the Commander Tapper is ideally suited for cycle tapping and O. D. threading, as well as routine machine tapping. Accurate blind hole tapping is said to be accomplished with ease and without damage to taps and equipment due to the Multi-Torque control. The spring clutch drive is claimed to eliminate slippage and wear caused by misadjustment and misuse. In addition, the spring clutch drive is said to be impervious to oil, grease, moisture, weather, and so on, with the clutch be-



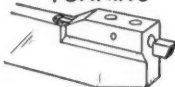
Commander Tapper

ing readily engaged and disengaged with a very slight force.

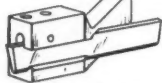
The torque of the Commander Tapper can be quickly and easily set to any size tap from No. 0 to $\frac{3}{4}$ inch. The adjustable torque control, preset for the tap size, permits the tap to move into and out of the work with automatic sensitivity. The torque can be set when the tapper is on or off the drill press by merely pushing a button and turning a scale to the desired position for the tap to be used. All

BULL DOG TOOL HOLDER

LATHES
TURNING



CUT-OFF



CUT-OFF



JUST A FEW ADVANTAGES OF BULLDOG HOLDERS

- (1) **Rigidity.** Bulldog holders will not permit a tool bit or cut off blade to shift, slip, weave or chatter. Essential where carbide and cast alloy cutters are used.
- (2) **Bits.** Can be used efficiently as short as you can grind them.
- (3) **Blades.** Will re-locate after grinding within .0001" of original position in holders after each re-grind. Blades also can be used as short as possible to grind them.

There are many more time and money saving advantages to Bulldog holders. Let us tell you about them. Special tool holders can be made to your specifications.

—Quick delivery.

Write for illustrated booklet **MMS.**



R & D TOOLHOLDER CORP.
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if it takes you more than

28 minutes to pierce this one panel...

then you'd better get a **WIEDEMANN**



The same short run piercing job took 28 minutes on a Wiedemann R-4P because layout time was completely eliminated. There was no waiting for the die set-up man . . . all punches and dies were carried in the turret of the machine right at the operator's fingertips.

There's a Wiedemann Turret Punch Press that can save you both time and money on every short run piercing operation . . . chassis, instrument panels, electrical boxes, bus bars, sheet metal parts, and plate up to $\frac{3}{8}$ " in thickness.

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WIEDEMANN MACHINE CO.

4219 Wissahickon Ave.
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HERE'S THE ACTUAL JOB!

Check these production times...
typical work of the R-4P.

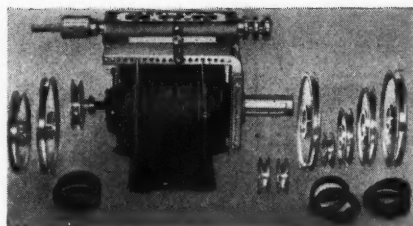
- * 42 strokes required to complete job
- * 8 different dies required - R-4P Pin Type Gauge
- * Total time to produce first piece - 28 minutes
- * Time for every subsequent piece - 9 1/2 mins.

operating parts of the unit are of heat-treated alloy steel and are precision ground to assure trouble-free operation. Heavy duty bearings are used throughout. The design of the taper housing is said to assure maximum visibility of the tapping operation.

McKelvey R.P.M. Selector

The Sunset Equipment Co., 1813 W. 11th St., Los Angeles 6, Calif., announces the McKelvey R.P.M. Selector, a unit which is designed for attaching to and becoming a part of the average electric motor on drill presses, lathes, band saws, jig saws, and conventional power tools. The unit permits a complete selection of motor speeds from a low of 66 r.p.m. to a high of better than 10,000 r.p.m. When applied to the conventional power tool, the selector is said to provide the equipment spindle speeds ranging from a low of 20 r.p.m. to a high of three times the motor speed.

The McKelvey R.P.M. Selector consists of three 6-inch pulleys, two 5-inch pulleys, one 3½-inch pulley, three 2-inch pulleys, one 3-inch pulley, one 1¼-inch step pulley, three special splines, a countershaft assembly, a motor mount, and three high quality belts. The motor mount and coun-

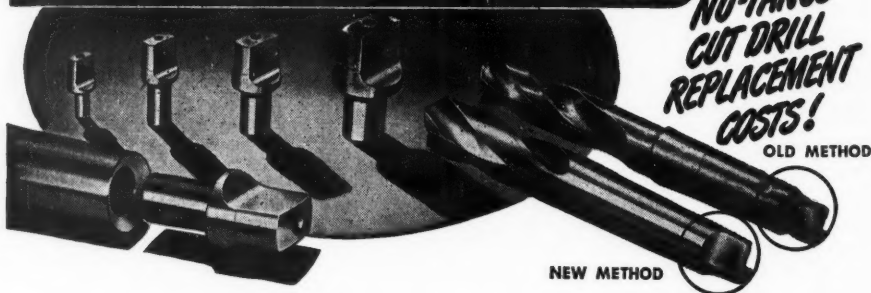


McKelvey R.P.M. Selector

tershaft assembly are designed for attaching to the electric motor housing. On each end of the selector shaft is a special spline which is permanently attached. The selector shaft drives an idler spline, equipped with special bearings, which, in turn, drives the power tool. Snap ball retainers on the splines permit the speed selection desired by the operator when pulley changes are necessary.

The McKelvey R.P.M. Selector is precision made and utilizes high grade ball and needle bearings for long life and quiet operation. On the average drill press or lathe with the standard accessories and belts of the selector, 120 different spindle speeds may be obtained.

NEW DRILLS FROM OLD WITH NU-TANGS



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size—and with **GUARANTEED ORIGINAL STRENGTH**. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.
*Patent Pending.

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1337 Bates Street
Cincinnati 25, Ohio

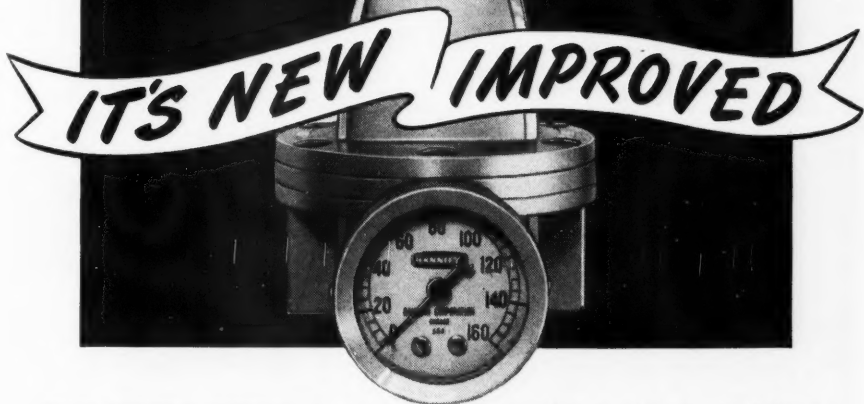
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today*

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PRESSURE

REGULATOR



EXACT PRESSURE CONTROL. Accurate, sensitive; secondary pressure setting repeats exactly regardless of fluctuating flow conditions. For use on primary air pressures up to 150 p.s.i. Maintains any desired secondary pressure from 5 to 125 p.s.i.

EASY TO "BACK OFF" PRESSURE. Instant downward pressure adjustment merely by turning control knob. Ideal for reducing cylinder pressure without exhausting control valve.

NO PRESSURE BUILD-UP. Absolute stability of secondary pressure

even under dead end conditions.

FINE QUALITY. Small, compact, and moderately priced, but unexcelled for precision construction. Nylon valve seats. Instrument type control knob and fine threaded adjusting screw. All non-corrosive materials. Built-in fine mesh bronze strainer. Sizes 3/8" and 1/2".

ENGINEERING RECOMMENDATIONS. If you use or if you build air operated equipment, ask for Hannifin engineering recommendations. New bulletin on request.

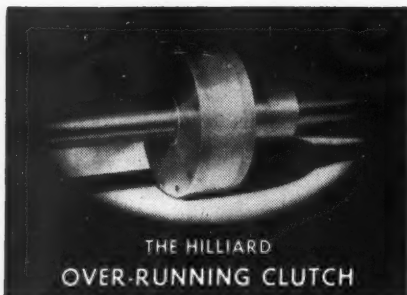
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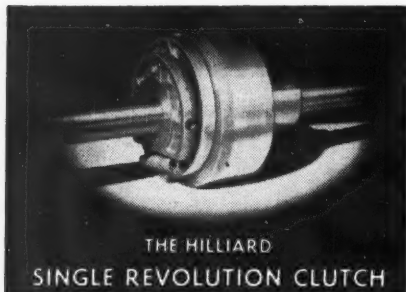
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A "Free Wheeling" Clutch of simple design recognized for many years as "Standard Equipment" for Automatic Dual Drive operation—Automatic operation of 2 Speed drive—As a ratchet permitting infinite adjustment and as an automatic backstop. Furnished in a number of types.



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Wherever extremely accurate control of intermittent machine operation is essential the Hilliard Single Revolution Clutch is unequalled. Its accuracy has won for it the acceptance of Industry for cutting, punching and packaging operations.



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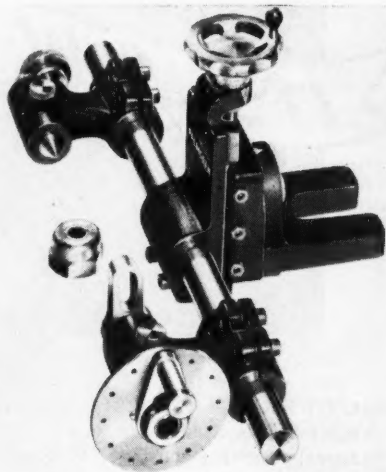
ELMIRA, N. Y.

Manufacturers of
INDUSTRIAL CLUTCHES

Palmgren No. 300 Indexing Milling Attachment

Designated as the Palmgren No. 300, an indexing milling attachment for use in performing difficult milling operations on engine lathes is now being marketed by The Chicago Tool and Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill. The attachment can be used in cutting gears, splines, keyways, oil grooves, slots, square shafts, hexagons, and flats on circular pieces. Work can be held between centers or in a collet chuck.

The Palmgren No. 300 Indexing Milling Attachment is designed to accommodate work up to 4 inches in diameter and 11½

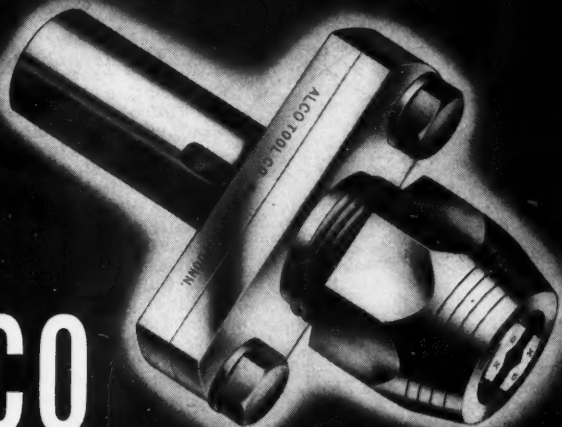


Palmgren No. 300 Indexing Milling Attachment

inches between centers when an 18-inch supporting bar is used. The attachment is constructed to fit lathes with tool posts up to 1¼ inches in diameter. The headstock and tailstock of the unit are accurately machined and held by keys on the supporting bar, which has a full length keyway for horizontal movement of the headstock and tailstock. A vertical feed travel of 1½ inches is provided by a dovetail type slide and fine screw adjustment. Gibs are provided with adjusting screws for wear take-up.

The Palmgren No. 300 Indexing Milling Attachment is furnished complete with a chuck having a ½-inch capacity collet; tailstock center; and 12-hole indexing plate with arm. Indexing plates for other divisions can also be furnished.

ALCO TAP HOLDERS



Because the screw machine industry is of such tremendous importance in this modern war age in the production of the material to help bring peace as quickly as possible, it behooves each and every operator to see to it that his tool holders are so designed that they will lengthen tool life and obtain the maximum of production perfection.

Faster set-up, the elimination of all bushings, uninterrupted production, and adjustable, compensating concentricity are features provided by all ALCO TOOLS. On old machines with worn spindles, these features help overcome imperfections in work produced.

On new machines, they form an unbeatable combination of production efficiency.

THE TAP HOLDER SHOWN ABOVE IS JUST ONE OF THE FAMILY OF ALCO TOOL HOLDERS FOR ALL DRILLING, TAPPING AND THREAD CUTTING OPERATIONS ON SCREW MACHINES. WRITE FOR COMPLETE CATALOG.

ALCO TOOLS

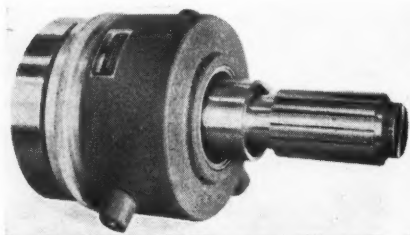
THE ALCO TOOL CO.

152 Birdseye St., Bridgeport, Conn.

Detroit Office: 908 Stephenson Bldg.

Erickson Special Double Sleeve Air-Operated Mandrel

A special double sleeve air-operated mandrel whereby steel tubing with inside diameters within the range of $2\frac{1}{2}$ to 3 inches is held automatically for straddle-facing and turning operations is announ-



Erickson Special Double Sleeve Air-Operated Mandrel

ced by the Erickson Tools Division, 2309 Hamilton Ave., Cleveland 14, Ohio.

The Erickson air chuck principle is utilized to actuate the special draw-bar mandrel. By easily removing the mandrel as-

sembly and substituting two simple standard air chuck parts, the fixture can be quickly converted to a standard type air-operated collet chuck.

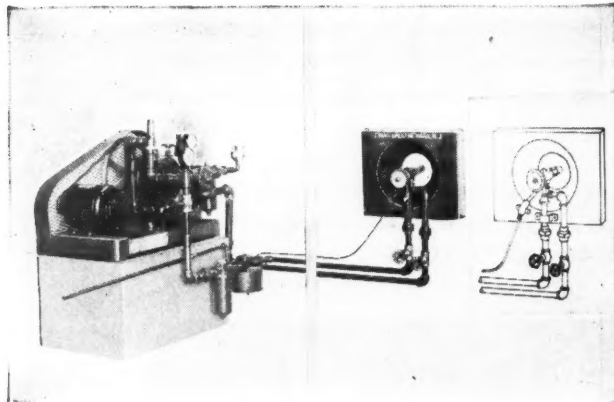
Galco and H & G Master Pushers

Featuring a collet-type grip and release, Galco and H & G Master Pushers for automatic and hand screw machines are now being made and marketed exclusively by the Modern Collet & Machine Co., 401 Salliotte St., Ecorse 18, Mich. Although they differ in construction detail, both types of pushers operate on a collet-action principle which provides several advantages. On the feed stroke, an internal taper in the master rides up on a taper on the interchangeable insert, closing the insert with a positive grip to assure a uniform feed and prevent stock rebound. On the back stroke, the grip is automatically released, and the pusher slides freely over the stock, thus preventing scratching of the stock, prolonging the life of the insert, and reducing wear throughout the mechanism.

With both types of pushers, the insert is locked in the master without screws and can be quickly removed. Size change is further facilitated by the use of a one-

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One or more burner nozzles may be used with one pump set.

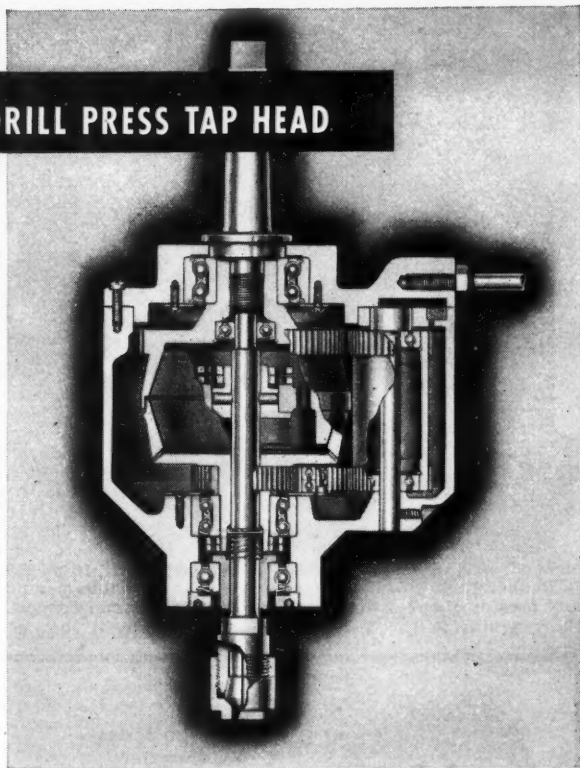
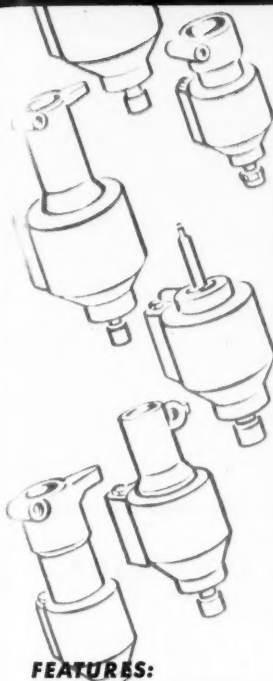
Let us figure up your possible savings over other fuels.

Send for a Sample Layout without obligations.

LEIMAN BROS.

**168-5 Christie Street
Newark 5, N. J.**

SNOW DRILL PRESS TAP HEAD



FEATURES:

- Drive shaft hardened and ground.
- Spindle in balance.
- Light weight clutch
- Spindle bushing revolves with bearing.
- No lateral float.
- Collets ground throughout.
- Eight ball bearings.
- 2:1 reverse speed.
- Hardened alloy gears and studs.
- Delivery from stock.

The SNOW Drill Press Tap Head is the same unit as used on the SNOW Full Universal Tapping Machines. It is the only Tap Head designed and manufactured for a machine tool by a machine tool builder.

Engineers and mechanics will recognize the rigid, sturdy construction; and operators will vouch for length of service, ease of operation, and quality of work produced.

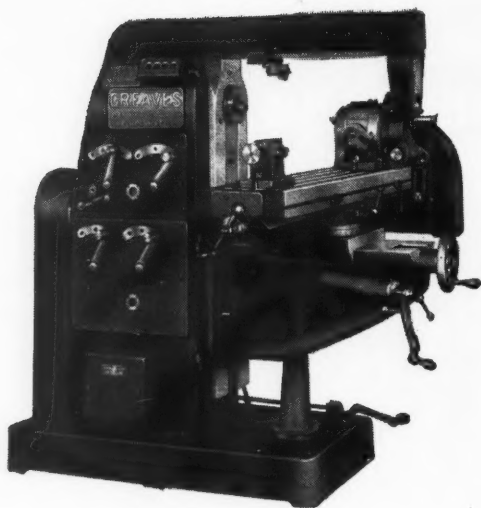
Eighteen years of production testing, and thousands of installations have proven the advantages of using a precision built drill press tap head.

These units are available in three sizes—0 through $\frac{1}{4}$ "; No. 6 through $\frac{3}{8}$ "; and No. 10 through $\frac{1}{2}$ "—both Morse taper and quill clamp styles are in stock.



SNOW MANUFACTURING COMPANY

443 EASTERN AVE., BELLWOOD, ILL. • SUBURB OF CHICAGO



Greaves No. 2 Heavy Milling Machine

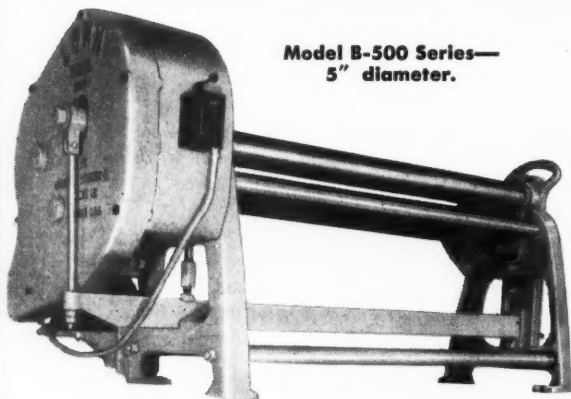
Greaves No. 2 Heavy Milling Machine

A rugged, full-powered heavy milling machine, designated as the No. 2, has been placed on the market by Greaves Machine Tool Co., N-2015 Eastern Ave., Cincinnati 2, Ohio. This unit is a basic type miller with several desirable features and stressing simplicity of construction and operation.

Among the outstanding features of the Greaves No. 2 Heavy Milling Machine is the arrangement whereby all shafts in the spindle gear train roll on anti-friction bearings. Gears are hardened and lapped; both spindle and feed type gears run in oil. The machine is equipped with a Timken bearing spindle. The spindle speeds cover a range of from 20 to 1000 r. p. m.

piece insert. With both Galco and H & G Pushers, all inserts can be used with any master of the same size regardless of the machine in which it is used.

The table feeds are from 1/2 inch to 20 inches per minute. Equipment includes a rapid traverse in all directions, actuated by a foot pedal. Both table and saddle



Model B-500 Series—
5" diameter.

LOWN

SLIP ROLL FORMING MACHINES

Meet Job Requirements
for Peak Production

Our machines are fast, efficient, sturdy, and easy to operate. They are built in a range of sizes from which you can choose the exact unit required.

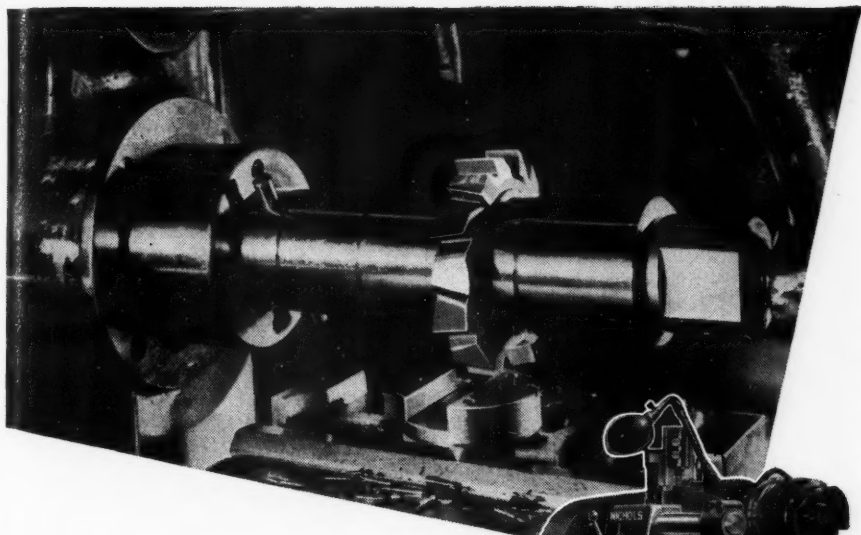
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SAN ANGELO FOUNDRY & MACHINE COMPANY

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E. UPTON AND SFE TRACKS

Distributors in Most Principal Cities



IF YOU *have* A TOOLROOM OR LABORATORY
YOU *need* A NICHOLS TOOLROOM MILLER

Everybody who has a toolroom or laboratory can use a Nichols Toolroom Miller. And there's good reason—for the Nichols Miller, arranged for the toolroom, is more than just an ordinary milling machine. In addition to conventional milling, the Nichols can do grinding, turning, boring, and, by virtue of its unique rise-and-fall spindle, contour milling and broaching.

The extremely precise operation that you expect is easily obtainable on the Nichols Toolroom Model. Hand wheels, with large adjustable micrometer dials, provide for extremely fine longitudinal and transverse feeds. An extra large hand-scraped table (8' x 30"), with three T-slots, insures rigid set-up of long, light pieces requiring cuts up to 19" in length. These, plus the basic features included in all Nichols Millers—hardened and ground spindle mounted in preloaded bearings, heavy box-sectional knee with long, hand-scraped dovetail slides, accurate feed screws—combine to provide productive capacity that will meet the closest tolerances demanded in your toolroom or laboratory.



For more complete details on this versatile machine that "uses its head" to produce unusual forms accurately and with fine finish, send for the Nichols Miller Catalog.



T H E *Nichols* **M I L L E R**

MANUFACTURED BY W. H. NICHOLS COMPANY, WALTHAM 54, MASS.
NATIONAL DISTRIBUTORS: NICHOLS-MORRIS CORP., 44-A CHURCH ST., NEW YORK 7, N. Y.

LESS CLEANING
TIME

MORE PRODUCTION
TIME



WITH A

Doyle VAC-IT

Subtract from cleaning expenses and add to production profits the time you can save by taking advantage of the powerful cleaning capacity of the Doyle Vac-It. Production machinery is thoroughly cleaned and freed of all clogging dust, dirt and grime in a fraction of the time ordinary cleaning methods take. Metal chips, shavings, grease and liquids are quickly removed from working surfaces leaving them clean and dry. So efficiently does the Doyle Vac-It perform that it is not necessary to stop production or shut down machinery during cleaning.

*Write today for informative Doyle Bulletins.
See how you can cut cleaning time and costs
throughout your entire plant.*

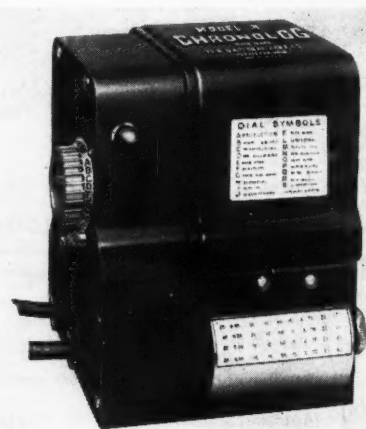
DOYLE VACUUM CLEANER COMPANY
3225 Stevens St., S.W., Grand Rapids 7, Mich.

slides and screws are provided with one-shot lubrication.

The Greaves No. 2 Heavy Milling Machine is equipped with either round or rectangular overarm support. The unit is powered with a 5 h.p. motor through triple Vee belts.

Chronolog Model X Production Control System

Designated as the Chronolog Model X, a system of production control now being marketed by Chronolog, Inc., National Bank Bldg., Detroit 26, Mich., is designed to meet the need for a positive, accurate,

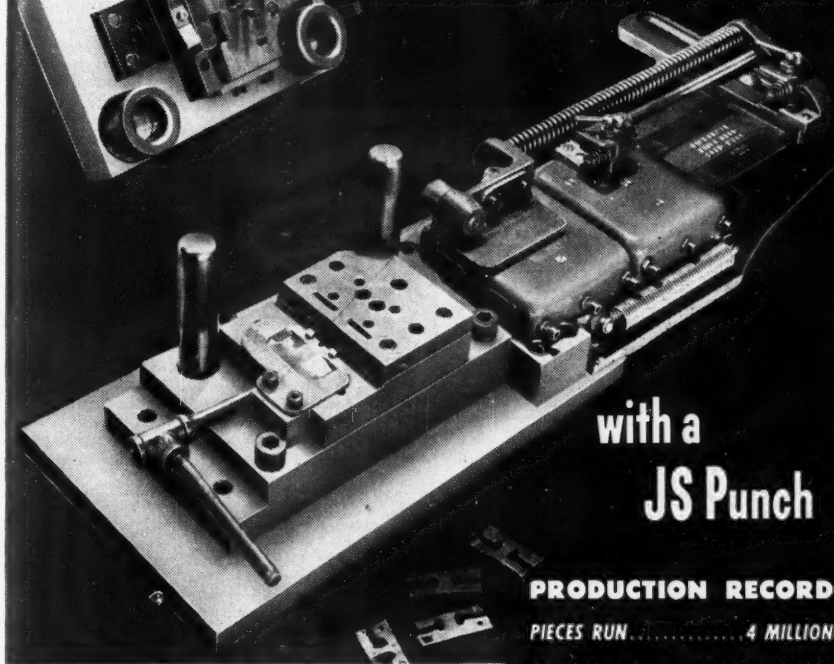


Chronolog Model X Production Control System

minute-by-minute record of personnel and machine performance—a direct link between the shop employee and management. The system provides a simple method for making available to the operator and his supervisor an accurate printed record of the number of pieces produced, the reasons for idle time and its duration, and other production details which occur during the day. The causes of discrepancy between rated efficiency and actual machine performance are immediately available from the Chronolog tape record either during operations or at the finish of each job or work shift. The corrective steps necessary can then be easily determined.

The Chronolog Model X Production Control System measures 8 inches high

a Knockout Performance



with a
JS Punch

PRODUCTION RECORD

PIECES RUN.....4 MILLION

No. of Pieces Between Grinds...150,000

Speed.....135 strokes per minute

Material Punched

.....025" spring steel stock

Punches and Cut-off Knives

.....J-S Chisel and Punch Steel

The Die is still in excellent condition

As evidenced above, J-S Chisel and Punch Steel —an oil-hardening steel for both hot and cold work—is exceptionally tough . . . stands up remarkably to fatiguing effect of repeated blows . . . excellent for punches and for chisels, cutters, shear blades, pneumatic tools, etc.

Firth Sterling

STEEL & TOOLING CORPORATION

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x 8 inches wide x 8½ inches deep and weighs 33 lb. The system is said to be adaptable to labor distribution, payroll accounting, machine efficiency, cost records, production records, standards, scheduling, management controls, and numerous other applications.

Lincoln Toolweld A & O Electrode

For hard surfacing tools and dies, The Lincoln Electric Co., Cleveland 1, Ohio, is now offering an electrode which is designed to simplify procedures and provide for maximum economy in the deposition of surfaces of weld metal of tool steel quality. Designated as Toolweld A & O ("A" for air-quench and "O" for oil-quench), the electrode is recommended for use in building up the working surfaces or edges of cold-working metal-cutting and forming tools.

The deposited weld metal is of the 5 per cent chrome type and may either be used as welded or subjected to a wide range of heat treatments. When used on ordinary steel, the weldment may be heat treated to provide the maximum hardness quality in the weld. When used on tool steel, the weldment may be heat treated

as is demanded by the nature of the base material.

The Lincoln Toolweld A & O Electrode can be used on such products as blanking dies, forming dies, die-casting dies, up-setter dies and punches, forming rolls, burnishing tools, centerless grinder rests, planer ways, flash shearing dies, and punches. The electrode can be operated on either a.c. or d.c. (electrode negative with d.c.), and is said to deposit a thick bead in one pass in the low-current portion of the operating range and a thin bead in the high-current portion of the range. The Toolweld A & O is available in sizes of ⅜, ½, and ⅝ inch having amperage ranges of 40-85, 65-130, and 95-180, respectively. The electrode is supplied packed in 10-lb. containers.

Pearson Precision Universal Drilling and Boring Fixture

A precision universal drilling and boring fixture for close tolerance drilling and boring work in toolrooms and machine shops is now being marketed under the trade name of Pearson by the Red Wing Motor Co., Red Wing, Minn. The unit can be used as a jig or for laying out and

Bearings Wear too Fast?

Repour next time with one of the MAGNOLIA BEARING METALS.

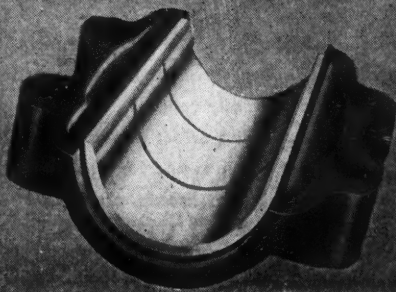
Lead-base alloys have a much lower coefficient of friction than any other bearing metal—1/3 that of "genuine" babbitt. The graphite treatment insures partial self-lubricating.

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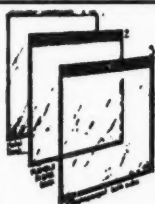
THE ONLY T-SLOT CLAMP

For use on all machines with T-slots.

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New Model 70

Multi-Wheel Num- bering Machine

**Machine and Shank
All One Piece.**

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Model No. 70

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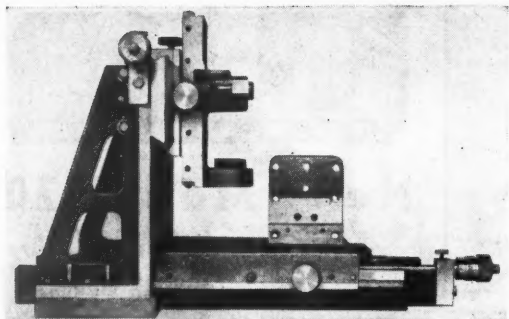
**Improved Type Holders, Hand or
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Type is easily, quickly loaded and unloaded. Simplest construction. A pin holds the type securely. No screws nor springs. Made in various sizes: 1/32" to 1/2" figures and letters.



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Pearson Precision Universal Drilling and Boring Fixture

being precisely controlled independently of each other by a self-contained micrometer measuring attachment that can be used to change or index the position of the work in relation to the guide bushing. When a boring bar is used, a hinged attachment is employed to form a double guide bearing.

making jigs. It is also adaptable for layouts, precision tapping, and so on.

Readily portable, the Pearson Drilling and Boring Fixture consists of a sliding table mounted on a bed with adjustable gib to which the work is fastened; a sliding carriage mounted on a rail with adjustable gib; a rail held absolutely parallel to the surface of the table by means of uprights which in turn are fastened to the bed; and a sliding headstock mounted on the carriage with adjustable gib. Longitudinal and lateral movement of the work are afforded, each movement

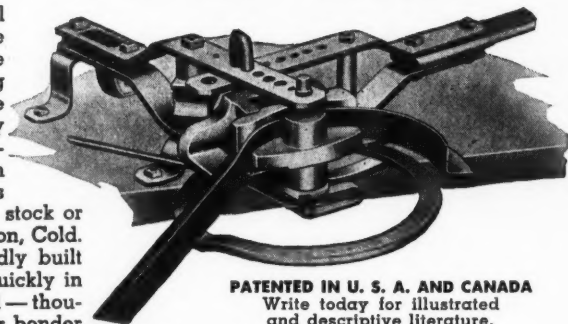
Westinghouse Weldomatic Welder

The Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa., is now marketing an automatic welder designated as the Weldomatic. The unit is supplied complete with welding head, control equipment, welding transformer, and work positioning equipment.

Suitable for welding with alternating or direct current, the welding head is designed to operate with a capacity of 1,200

LET THE HOSSFELD IRON BENDER SOLVE YOUR BENDING PROBLEMS

• Here's a universal pipe, bar and angle iron bender for the hundreds of bending jobs that must be quickly and accurately handled in maintenance and production work. Quickly bends 2" pipe, 4 1/2" flat bar stock or 2" x 2" x 1/4" angle iron, Cold. It's practical — ruggedly built — will pay for itself quickly in time and labor saved — thousands in use. No other bender like it.



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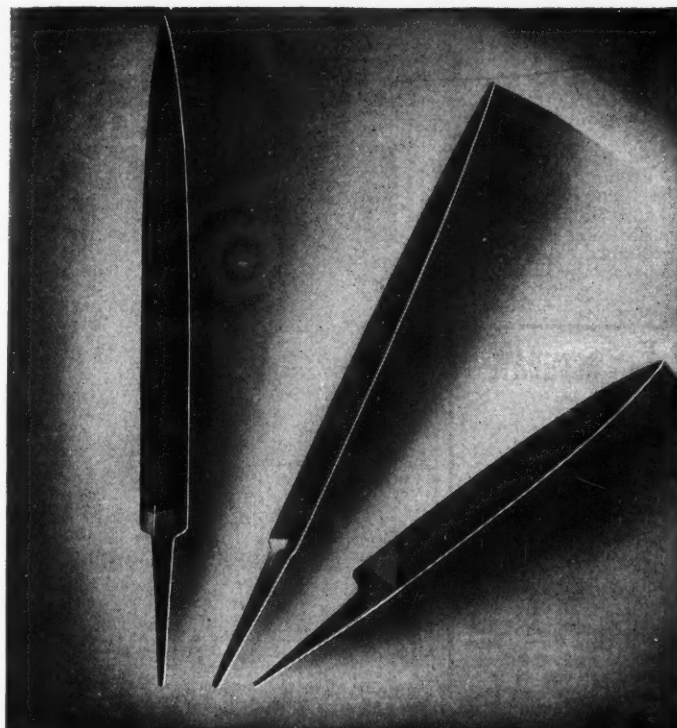
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February, 1948

MODERN MACHINE SHOP 281

amperes a.c. Special nozzles are available for 2,000 amperes a.c. The capacity for d.c. welding is 800 amperes. The head is so constructed that it can be rotated 360 deg. in a vertical or horizontal plane. As a result, it can be mounted in any position for welding.

Nozzles and knurled drive wire feed rolls are supplied to accommodate $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch wire. The wire feed is automatic. The speed of the driving motor is controlled by the burn-off rate of the welding wire through a bridge hook-up of arc voltage, control generator field, and potentiometer.

The motor-generator set is driven by a 2 h.p. 220/440-volt, 3-phase, 60-cycle a.c. motor. A 2-pole constant-potential generator supplies the control current, and a 2-pole variable-voltage generator pro-

SIMPLE — FAST — ACCURATE LOCATING



SIMPLE

Place instrument in spindle of boring mill (vertical or horizontal), drill press or jig borer.

FAST

200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

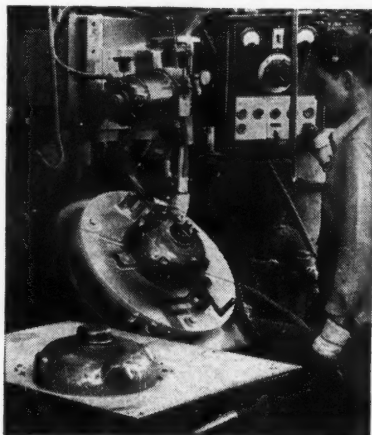
ACCURATE

Locate cross lines on work to match lines in viewing aperture.

Write for
catalogue No. 12

CENTER SCOPE PRODUCTS

3829 San Fernando Rd., Glendale 4, Calif.



Westinghouse Weldomatic Welder being used to weld a hub to the end bell of a motor

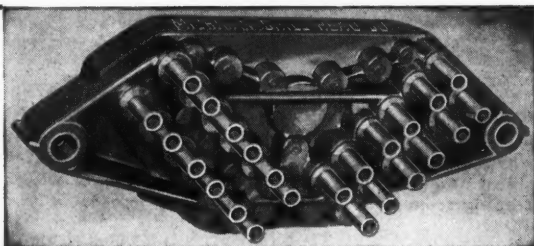
vides current to the driving motor in the head. Control relays and contactors required in the operating circuit are mounted in the control panel. Control equipment for starting and stopping the welding arc and traverse mechanism, as well as the adjustment for arc length, is mounted on the operator's panel.

The work positioning equipment is supplied to meet the demands of the job and includes semi-standard designs of travel carriages, mounting pedestal, rotator, positioner, and turning rolls.

Pictured: a 24-Spindle Heavy-Duty Drill Head.

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Available in sizes 7/0 through 10 and lengths from 1/4 inch to 6 inches. Others made to specification.

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Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

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Finest Industrial Diamonds

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INTERCHANGEABLE PUNCHES and DIES

**Quickly Inserted...
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Allied's R-B Interchangeable Punches and Dies are quickly inserted—rigidly held for accurate, trouble-free punching in the metal-working and plastics industries. They are available from stock in *standard* round, oblong and square shapes of almost any required size. Specials of any size, shape or material are promptly furnished to your specifications... and delivery dates are *dependable*.

Large, illustrated R-B Catalog gives complete details, specifications. Write for it.

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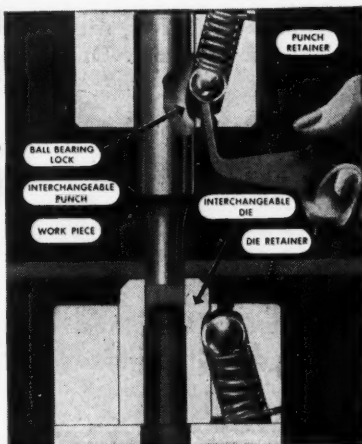


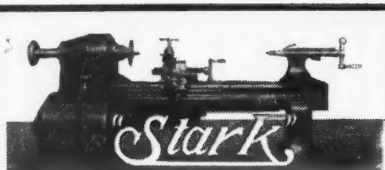
ALLIED PRODUCTS CORPORATION

Department 23

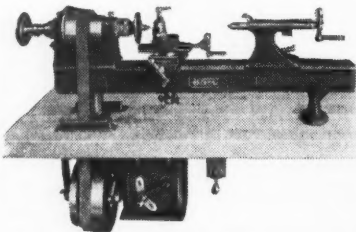
4624 Lawton Ave.

Detroit 8, Michigan





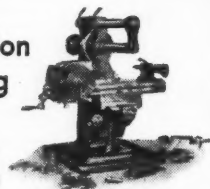
Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes $\frac{3}{4}$ " and 1". 30 Precision attachments available.



Open Cone Lathes world-known. Four sizes, with compact under-bench Motor Drive Unit.

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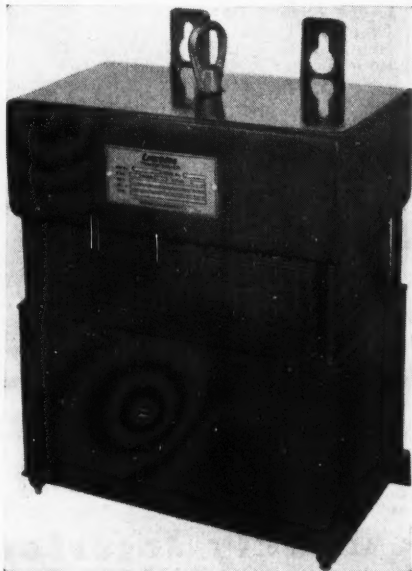
ESTABLISHED · 1862

Originators of the American Bench Lathe

Lindberg Power and Lighting Transformer

The Lindberg Engineering Co., Transformer Div., 2444 W. Hubbard St., Chicago, Ill., announces the availability of a power and lighting transformer in sizes from 1 to 100 kva.

Rated from 1 to 15 kva, the transformer is totally enclosed for outdoor and indoor use and, in the standard rating, is made to operate at a rated frequency and on any of the rated voltages up to 600

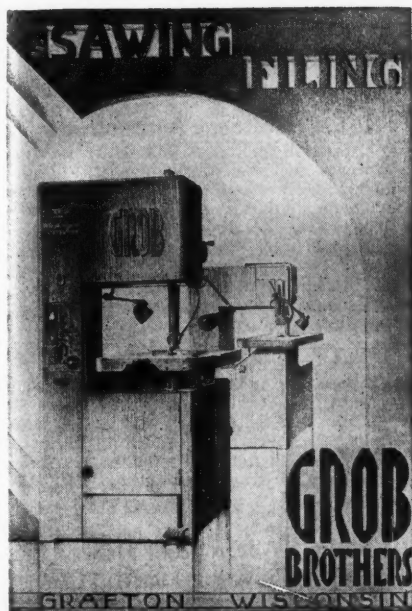


Lindberg 3 Kva Power and Lighting Transformer

volts. The design includes a wiring compartment which is manufactured with knockouts to facilitate any conduit arrangement.

Snap-On Ferret Set

A set of streamline and completely redesigned $\frac{3}{8}$ -inch drive sockets, including handle, designated as the Snap-on Ferret Set, is announced by the Snap-on Tools Corp., Kenosha, Wis. The palmgrip handle is designed to conform to the shape of the user's hand.

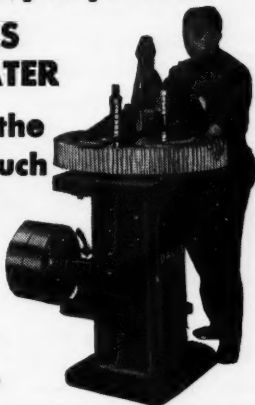


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**DAVIS
KEYSEATER**

will do the
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quicker
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better?

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SAVAGE NIBBLING MACHINE

FOR FAST ACCURATE CUTTING OF
FLAT SHEETS BY TEMPLATE OR TO
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AND SHAPING

Sheets
Flat mild $\frac{3}{8}$ "
Tough alloys $\frac{1}{2}$ "

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Wall thickness to $\frac{1}{4}$ "
1" I.D. to 36" O.D.

"NIBBLE YOUR COSTS"

Low initial investment.
Eliminates expensive dies.

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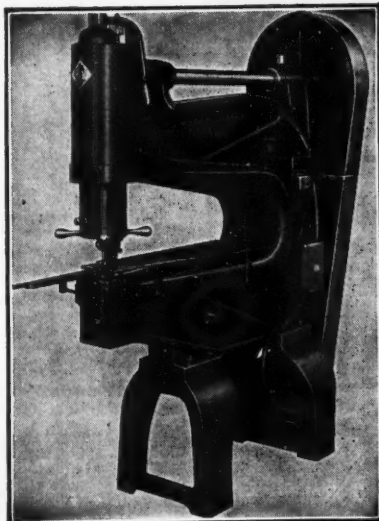
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Since 1885

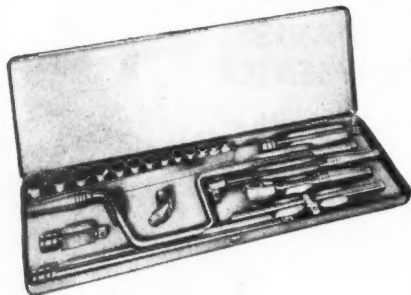
KNOXVILLE

TENNESSEE

Pioneer Manufacturers of Nibbling Machines



The set includes sockets which provide a size coverage between $\frac{1}{4}$ to $\frac{3}{8}$ inch. Each socket has four indentations on the



Snap-on Ferret Set

inside of the drive hole to facilitate the engaging of the ball located in the handle of the driving unit. Size markings provide for the easy selection of sockets, which are finished in full chrome and highly polished.

The Snap-on Ferret Set includes an at-

tractive red-finished box which has rounded corners and extra deep partitions.

Hobart Softcast A Electrode

A copper-nickel alloy electrode having a mineral flux coating for metallic arc welding, designated as the Hobart Softcast A, is announced by The Hobart Brothers Co., Hobart Square, Troy, Ohio. Weld deposits produced with the electrode are said to be non-ferrous, light gray in color, malleable, easily machinable, and to possess a high tensile strength equal to good cast iron.

Especially adaptable to the welding of cast iron where the weld area must be machined, drilled, or tapped anywhere in the weld zone, the Hobart Softcast A Electrode is available in $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch diameters in 18-inch lengths, center brushed. It may be used with either alternating or direct current.

"Unbrako" Alloy Steel Dowel Pin

The Standard Pressed Steel Co., Box 556, Jenkintown, Pa., announces the addition of a high grade alloy steel dowel pin

Severance

TUBING CUTTER GROUP - FOR FAST DEBURRING OF EVERY MACHINEABLE TYPE TUBE ...

TUBE DEBURRING CUTTERS (Standard)



18 Standards in H.S.S. and Cemented Carbide

ADJUSTABLE TYPE



Adjustable from $\frac{1}{2}$ " - $2\frac{1}{2}$ " O.D.—for short runs

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23 sizes from $\frac{3}{16}$ " - $2\frac{1}{2}$ " O.D. — Chatterless

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16 sizes from $\frac{1}{4}$ " - $1\frac{5}{8}$ " O.D. — H.S.S. and Carbide

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From light hand-deburring up to close tolerance deburring, chamfering, flaring . . . For working non-ferrous metal, steel (including stainless) and plastic tubing . . . For combining reaming, sizing or flaring with end facing and deburring . . . Whatever the operation or material, Severance HSS and Cemented Carbide Tube Deburring Cutters are TOPS in performance—long life—economy.

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**STANDARD
D - 4
Abrasive
Band Grinder**

Famous
for
Stamina

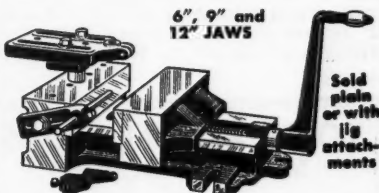
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 $\frac{1}{4}$ " band. The ideal portable unit.

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MANUAL ON FINISHING—WRITE TODAY

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for holding plain or irregular
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work



6" 9" and
12" JAWS

Sold
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or with
jig
attach-
ments

GRAHAM MULTI-PURPOSE VISE

This flush, parallel, square-finished vise comes with all sorts of jaws, stops, guides, etc., making it a ready-made jig or fixture. Sizes up to 124 lbs. for drill press, radial, planer, shaper, miller, grinder. ASK ABOUT OUR KNURL HOLDER FITTING LATHE TURRET.

With a set of these vises (3 sizes) in your toolroom, you are equipped to handle many, many jobs without the special jigs or fixtures that would otherwise have to be made.

"Adjust-angle" KNURL HOLDER



Fitting lathe
turret

Requires only
straight knurls
to cut many
different pat-
terns on work
up to 2 $\frac{1}{2}$ " dia.



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Price Bulletin 41

Graham Mfg. Co.

30 Bridge St.

Providence, R. I.

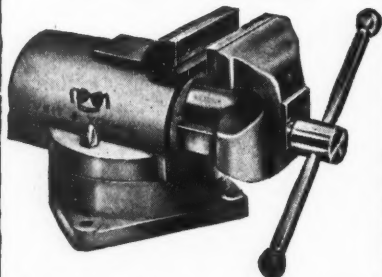
to its line of "Unbrako" products. Hardened and precision ground, the pin can be used as a locating or aligning pin; for permanent assembly; as a lock-up pin on dial plates, bushings, and so on; as a register pin for operating micro-switches, and so on; as a plug gage to check drilled holes, and for numerous other applications.

According to the manufacturer, the Unbrako Dowel Pin has a surface hardness of Rockwell C 60-62, core hardness of Rockwell C 50-54, single shear strength of 144,000 to 150,000 p.s.i., and tensile strength of 240,000 to 250,000 p.s.i. The

pin is furnished packaged one dozen in a box which is waxed to prevent any leakage of the rustproofing compound before it congeals and becomes a sealer. Each box label is clearly marked as to the number of pins in the box, the diameter size, and the length. The color of the background promptly identifies the type of pin; that is, red labels are used on boxes containing standard size dowel pins, which are 0.0002 inch over the listed or nominal diameter, while blue labels are used on boxes holding dowel pins 0.001 inch oversize. Special dowel pins are packed in boxes having brown labels.

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Immediate Delivery



Long guides for jaws provide strong grip. Easy swivel. Jaws: 3½", 4", 5" open to 5", 6", 8".

A few choice territories open for representatives.

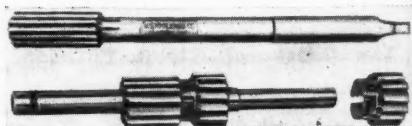
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Established 1926
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U. S. Rolling Process for Producing Reamers

A procedure for the making of standard and special high speed reamers wherein cutter blades of high speed steel are firmly fastened in recesses of a tool body of



High Speed Reamers Made by U. S. Rolling Process

low carbon steel by means of a rolling process is announced by the U. S. Tool and Manufacturing Co., 6906 Kingsley Ave., Dearborn, Michigan.

With the rolling process, which involves no application of heat, worn or under-size reamers can be rerolled at the factory several times to restore the original diameter to precision limits. Standard as well as special high speed reamers can be produced by the process.

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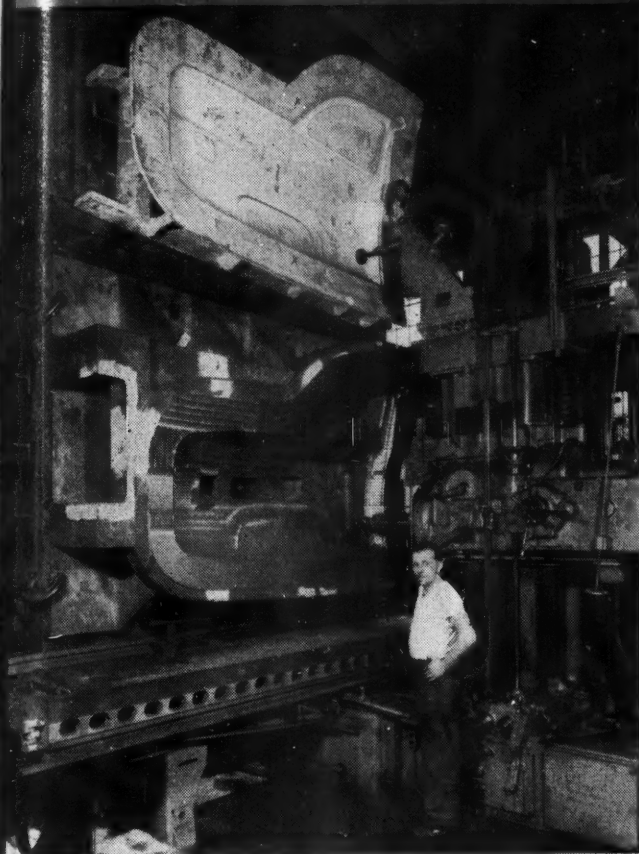
We have:

ONE, FOUR and SIX spindle automatics maximum capacity 2½" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

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SCREW MACHINE SPECIALTY CO., • 5700 Butler St., Pittsburgh 1, Pa.

NO MACHINE TOO BIG
TO BE TURCHAN-EQUIPPED



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TURCHAN FOLLOWER MACHINE CO.

*Oldest Manufacturer of Hydraulic Duplicating
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BEARINGS that
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on many jobs.



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Self-Lubricating Bearings do not throw oil.
Let us send you samples and data sheets.

PARAMOUNT OILLESS BEARING CO.
WORCESTER 3, MASS.



CUT ANY SHAPE, CLEVERLY
...with a
BEVERLY Throatless SHEAR

Cuts straight and irregular shapes faster — better! Order No. 1 for 14 ga. (with High Carbon, High Chrome Blades for 18 ga.); No. 2 for 10 ga. (with H.C.H.C. blades for 14 ga.); and No. 3 for $\frac{1}{8}$ " mild steel or 10 ga. stainless. Write for catalog!

THE BEVERLY SHEAR MFG. CO.
3000 W. 111th St., Dept. 3, Chicago 43, Ill.

Niederst Backstand Idler

An unusually rugged yet lightweight backstand idler which is designed to accommodate polishing belts from $\frac{1}{2}$ to 6 inches wide is now being marketed by the Niederst Co., 3506 S. Michigan Ave., Chicago 15, Ill. Designed to permit the use of present polishing and buffing lathes for belt polishing, the unit includes a contact wheel and idler pulley over which the belt operates.

In addition to manufactured contact wheels, the Niederst Backstand Idler is



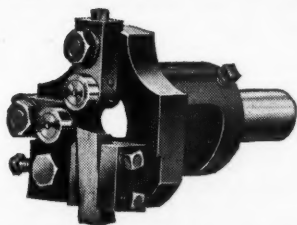
Niederst Backstand Idler

designed to use buff contact wheels. Any width wheel desired may be obtained by placing as many sections of buffs as desired on the lathe spindle. The hardness or density is controlled by using stitched or loose buffs. Loose buff wheels may be made from very soft to very hard by using various diameter flanges to hold them on the spindle. The closer the diameter of the flange is to the diameter of the buff, the harder the wheel.

The idler pulley of the unit is an 8-inch diameter x $6\frac{1}{4}$ -inch wide statically and dynamically balanced lightweight aluminum pulley. Husky ball bearings in the pulley arm reduce bearing travel and speed. Since the shaft of the backstand idler revolves and the housing remains stationary, the tendency for the lubricant to be thrown from the bearings by centrifugal force is minimized.

The construction of the Niederst Back-

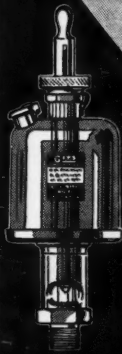
WATSON Tangent Cut Box Tool



A general purpose, tangent cut, roller rest box tool of wide range for turning diameters from bar stock, castings, forgings or other material. Applicable to all sorts of screw, turret and other machines, hand or automatic. It is simple to set and eliminates resetting when it is necessary to grind the bit. Write for descriptive folder giving complete information.

The Watson Mfg. Co.
2222 ALBION ST. TOLEDO 6, OHIO

CONTROLLED OILING *at your fingertips*



Gits Gravity Feed Oiler controls oil flow by simple turning of a knurled screw. Flow can be shut off completely during idle periods. The transparent reservoir shows quantity of oil present, and rate of flow may be viewed at all times through a sight glass in the shank. Available in several models, Gits Gravity Feed Oilers are especially adapted to high vibration operations. Sizes, models, prices on request.

Write for the Wealth of Lubricating Information in Gits Catalog No. 60.

GITS BROS. MFG. CO.

1845 South Kilbourn Avenue

Chicago 23, Illinois

Exclusive for over 40 years

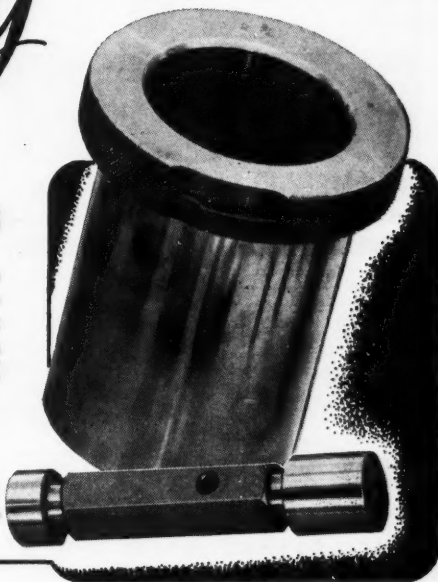
Economy DRILL JIG Bushings — Gages

ALL A. S. A. STANDARD types and sizes, in stock—ready for immediate delivery. Also excellent delivery on NEW GAGES and Gages salvaged by HARD CHROMIUM PLATING.

*Bulletin and Price Lists
sent promptly upon request.*

ECONOMY TOOL & MACHINE CO.

1827 S. 68th St., Milwaukee 14, Wis.



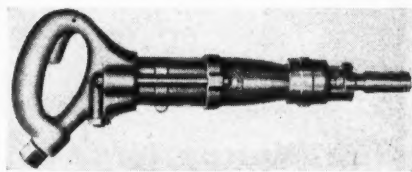
stand Idler also includes a specially designed shock absorber which is said to eliminate any shock to the machine if the belt breaks. Moreover, the absorber is claimed to be particularly useful where narrow belts are employed since it applies the tension gradually and helps loose buff contact wheels to attain their full diameter before complete tension is applied to them. The shock absorber has a self-releasing valve so that the counterweight used to provide belt tension may be lifted without any hydraulic back pressure.

The idler arm swings on a turret which encloses the angular adjustment mech-

anism. The pulley arm is said to have a sufficient range so that the same length belt may be used on a 16-inch contact wheel as well as a 6-inch diameter wheel. The backstand idler also has a wide range of lateral movement. Both angular and lateral adjustments are controlled by levers conveniently located on the lathe, thus allowing the operator control of the machine from his normal working position.

Cleco Handi-Drill

Especially useful in close quarters and in all types of masonry, a lightweight hand-held drill which is designed to hit and rotate at the same time is now being



Cleco Handi-Drill

marketed by the Cleco Division, Reed Roller Bit Co., P. O. Box 2119, Houston, Texas. Designated as the Handi-Drill, the tool, which weighs 9 lb., can be operated with one hand, thereby leaving the other hand free to protect the operator when working on ladders, and so on. The design of the tool includes a safety retainer which is claimed to prevent accidental release of the drill from the unit.

Said to have practically no recoil, the Cleco Handi-Drill can be operated at a speed of 1,800 to 2,000 r.p.m. and has a $\frac{1}{4}$ to $\frac{3}{4}$ -inch drill capacity. The tool measures 13 inches long without the retainer.

TYPE HOLDERS AND TYPE	ROLL MARKERS
HAND STAMPS LOGOTYPES	DIES STANDARD
AND SPECIAL STAMPS	INSPECTORS' STAMPS
MACHINE ENGRAVING	PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

S & S HINGES

VARIOUS WIDTHS
and GAUGES

BUTTS AND
CONTINUOUS LENGTHS

WRITE FOR PRICES

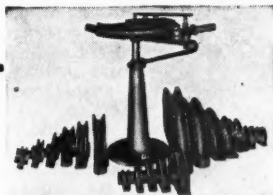
S & S MACHINE WORKS

4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

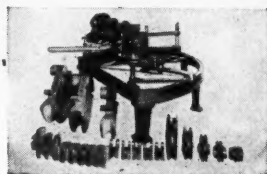
For
GUARDS
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CASES
BOXES



**BY HAND or MOTOR
MACHINES TO BEND COLD PIPE, CONDUIT, BOILER TUBING
AND SOLID BAR . . . BENDING TABLES ALSO AVAILABLE**



Above: Hand-powered Type A-30 . . . up to 180° bends . . . all sizes from 1/2" to 2". Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies . . . this process makes shorter tangents than any other. Occupies only 18" x 18" floor space!



Above: Motor-powered Type E . . . bends fixed radii of 6 to 1 up to 90°. Type E bends 2 1/2", 3", 3 1/2" and 4" pipe. 3 horse-power motor. Floor space occupied—7' 6" x 7' 6". Other power machines up to 8" capacity.

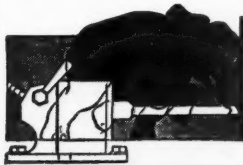
Other Sizes Available

**Factory and Main Office: 14 Furnace St.,
Poultney, Vermont**

**"American"
PIPE BENDING MACHINE
Company INC.**

Cut Costs With **MEAD MIDGET AIR CLAMPS**

**Horizontal and
Vertical**



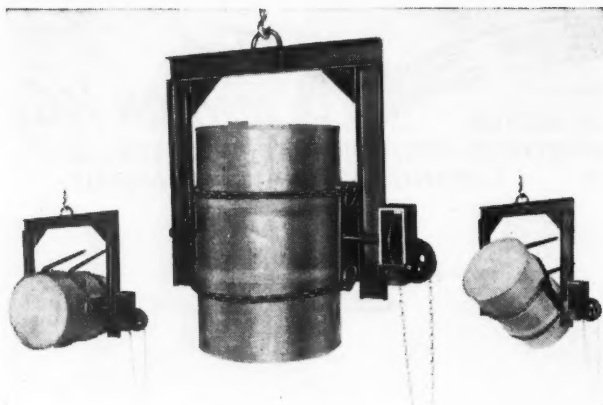
Both models deliver 80 lbs. pressure on a line pressure of 100 lbs. They'll save countless man-hours in assembly operations involving welding, riveting, bolting, etc. **Advantages over mechanical clamps:** 1. Any number can be operated by single master valve. 2. Easily installed in cramped corners. 3. Equal ram pressure at any stroke point. Send for new Mead AIR POWER Catalog, describing our line of Air Clamps, Air Vises, Air Presses, Work Feeders, Valves, Controls, etc.

MEAD SPECIALTIES COMPANY

4114 N. KNOX AVE.

Dept. AA-28

CHICAGO 41, ILL.



Palmer-Shile Drum and Barrel Tilt, of Welded Steel Construction, for Tilting Drums or Barrels

Palmer-Shile Drum and Barrel Tilt

Designed to simplify materials handling and completely eliminate hand dumping, the drum and barrel tilt shown herewith, product of the Palmer-Shile Co., 16022 Fullerton Ave., Detroit 27, Mich., is claimed to be excellent for the controlled dumping of chemicals, liquids, plastics,

molding powder, scrap, glass, and so on. The unit has a 1,000-lb. capacity and is designed to accommodate a standard 55-gallon drum or barrel. Tilts of special sizes or capacities can be built to suit individual requirements.

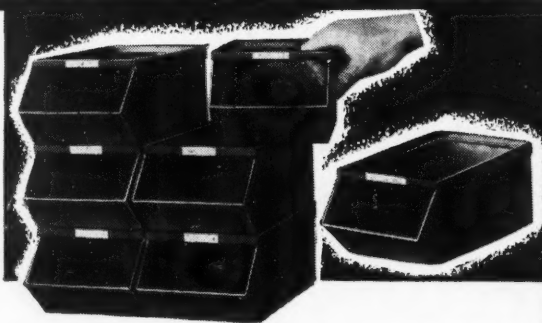
The Palmer - Shile Drum and Barrel Tilt is equipped with two safety style

locking devices which are said to hold the barrel firmly without slippage. The arrangement of the unit is such that the barrel can be turned 360 deg. The turning mechanism utilizes the worm principle and is available in hand chain models. The entire assembly is of heavy structural steel, completely welded throughout, and weighs approximately 125 pounds.

Parts...

★ Where You Want Them . . .

★ When You Want Them



You'll save time, space and labor handling parts and material when you use these patented STACKBINS. STACKBINS keep parts instantly accessible - eliminate waste

hand motions - stack compactly to form units of exactly the right shape and capacity - make order filling or assembly work faster, easier, more efficient.

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa

Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN

"Stacked and



Still Accessible"

SYSTEM

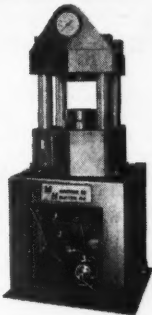
HOBBING PRESS

Capacities 30 to 400 Tons

- Low Cost Operation
- Self-Contained
- Sturdily Built
- Prompt Delivery

Prompt response—absolute control of moving parts for precision blanking, forming, drawing, shearing, and other uses.

Ready to operate—just hook electrical connection to your power line. Minimum floor space.



Door removed showing interior

Special M & N Hydraulic Hobbing Presses built to your specifications. Write for catalog on standard M & N presses.

Hydraulic Division

M & N Machine Tool Works, Inc.
144 Orono St. Clifton, N. J.

ELECTRICAL EQUIPMENT
must have
PRECISION GEARS

Abart GEARS

Abart, long supplier of gears for electrical industry, knows the particular gear requirements. Every Abart gear is made to fit

the conditions of use as to design, material, cutting and finish. Spur, bevel, worm, worm wheels, spirals, internal—all to your specifications. Prompt delivery. Send B/P for quotation.

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Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind—not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.

\$42⁰⁰

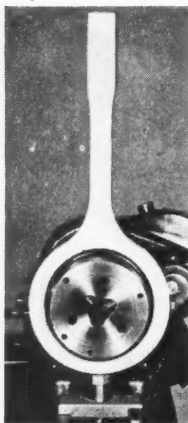
IN U. S. A.



Weight 12 ounces;
length 6¾ inches;
chuck size ⅜ inch.
Wheel guard removed for better illustration.

MADISON-KIPP CORP.
208 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS



Fry Model No. 3E1
Multi-Duty Speed
Chuck

Fry Model No. 3E1 Multi-Duty Speed Chuck

Said to combine the advantages of both the collet and jaw chuck, a multi-duty speed chuck which is quickly adjustable to accommodate concentric or eccentric work is announced by the Airco Products Co., 2933 Denby Ave., Los Angeles 26, Calif. Designated as the Fry Model No. 3E1, the chuck includes a positive tool steel jaw position lock for accurate repetitive chucking operations and may be opened or closed in motion (either direction).

Adaptable to either engine or turret lathes, the Fry Model No. 3E1 Multi-Duty

Speed Chuck has a capacity for $\frac{1}{8}$ to 1-inch round stock, $\frac{3}{16}$ -inch hexagon stock, and $\frac{3}{4}$ -inch square stock.

"Kendual" Fly Cutter and Face Mill

The Kendall Corp., 2343 N. 29th St., Milwaukee 10, Wis., announces a fly cutter and face mill which is designed to fit the conventional arbors and standard American spindle nose drives of milling machines. The construction of the cutter, which is designated as the "Kendual," includes hexagon shaped tool bit holders to permit easy angular setting of the tool bit, and positive locking means for maintaining the setting. The angular setting of each tool bit holder is said to be maintained even when the tool bit is removed for grinding.

The tool bit is clamped in the tool bit holder by means of a tapered spacer, clamping wedge, and clamp screw so located in the cutter body that the bit receives no shearing stress. The design is also said to provide for minimum tool vibration and adequate chip clearance. The cutter body is of heat-treated steel.

Dependable MEASURING & CHECKING EQUIPMENT

Ready to Deliver

STRAIGHT and OFFSET TYPE HAND WHEELS



STANDARD CAST IRON HAND KNOBS



SOLID

ROTARY

MACHINE HANDLES

MALLEABLE IRON LEVERS

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.



UNIVERSAL ANGLES
in 10 sizes, ranging from
4 x 3 1/4 x 5 and up.

BOX PARALLELS
in 15 sizes, ranging from
3 x 4 x 12 and up.

SLOTTED ANGLES
in 19 sizes, ranging from
4 x 9 x 5 and up.



SURFACE PLATES
Over 50 sizes, ranging from
7 x 7 1/4 to 96 x 192.

Send for Complete Catalog

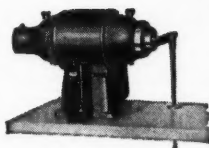
MACHINE PRODUCTS CORPORATION

6771 E. McNichols Road

DETROIT 12, MICHIGAN

IDEAL SPEED LATHES

For accurate, uniform,
speedy finishing of
metal & plastic parts.



POLISH LAP DE-BURR FINISH

For speedy, low-cost finishing of screws, studs, bushings, push rods, etc., investigate Schauer Speed Lathe NA1E: Motor, brake, and collet operated by a single foot treadle.

If You Have a Finishing Problem
WRITE FOR CATALOG 440

THE SCHAUER MACHINE CO.

Originators of Today's Speed Lathes
2060 READING RD., CINCINNATI 2, OHIO



"HEAVY DUTY" Pneumatic GRINDER

A powerful, versatile tool — can be fitted with three different spindle noses to handle mounted wheels with $\frac{1}{4}$ " diameter shanks, also unmounted wheels with $\frac{1}{4}$ " diameter and $\frac{3}{8}$ " diameter holes. Made with compound rotors, an abundance of power. Fitted with steel body, a real safety feature. Special grease-sealed bearings, no lubrication required. Prompt Deliveries. Speed such as to operate Tungsten Carbide burrs to their full efficiency.

M-B PRODUCTS
130-134 E. LARNED ST.
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BUTTERFIELD THRED-RITE DIES

The modern adjustable collet die at its best.

Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

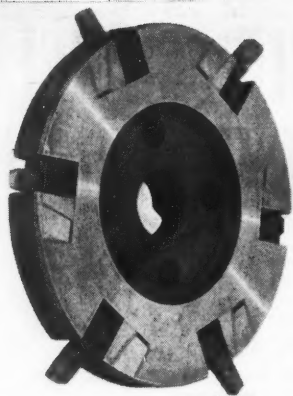
For accuracy, speed and long life specify Thred-Rite.

UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: Derby Line, Vermont, U.S.A.
Athol, Mass.; Mansfield, Mass.;
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Detroit.....5527 Woodward Ave.
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Toledo.....3636 Detroit Ave.



"Kendual" Fly Cutter and Face Mill

Each of the separate tool bits may be ground and individually positioned to do a portion of the job, thus combining in a single operation a number of complicated cuts. The cutter can be quickly and easily adjusted to the ever-changing requirements of either long or short-run

jobs and can be used in performing such operations as fly cutting, slotting, surface milling, straddle milling, form milling, and so on.

The Kendual Fly Cutter and Face Mill is available in 6, 8, and 10-inch sizes.

T.R.S. Toolroom Specialty Steel

To meet the need for a steel with high resistance to wear, unusual toughness and strength, and ductility to resist fatigue, The Amalgamated Steel Corp., Newburgh Mill District, Broadway and Wire Ave., Cleveland 5, Ohio, has developed a balanced alloy tool steel designated as T.R.S. Toolroom Specialty Steel. Intended for general purpose use throughout tool and maintenance departments, the steel, it is claimed, may be quenched in oil, water, or salt bath, thus enabling practically any degree of hardness to be obtained.

According to the manufacturer, T.R.S. Toolroom Specialty Steel will not crack in heat treatment, can be readily welded and forged, and machines with an excellent finish. The steel is available in flats, rounds, squares, hexagons, octagons, and billets in various sizes.

Special Small Equipment

for Plastic, Optical, Celluloid and Allied Industries

We have been growing up with these industries for 36 years. Plants all over the world turn to us for specialized engineering knowledge. Write for our new booklet showing some of our machines and special molds.

Representatives LESTER Injection Molding Machines

STANDARD TOOL CO. LEOMINSTER, MASS., U.S.A.

OUTFITTERS TO PLASTIC MANUFACTURERS SINCE 1911

Specialists in designing and building Plastic Molds

Electric Steam Table

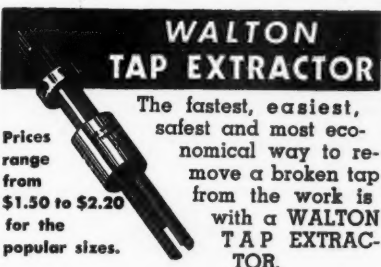
Power Jig Saw



WHEN YOU BREAK A TAP YOU NEED A

WALTON TAP EXTRACTOR

Prices
range
from
\$1.50 to \$2.20
for the
popular sizes.



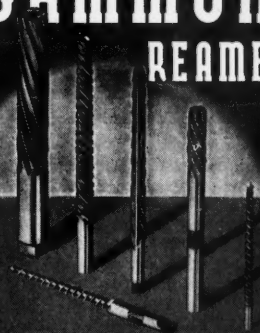
The fastest, easiest,
safest and most eco-
nomical way to re-
move a broken tap
from the work is
with a WALTON
TAP EXTRACTOR.

**No Mangled Threads—
No Scrapped Work—
No Frayed Nerves**

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Hartford 10, Conn.

CAMMONS REAMERS



Manufacturers of

The Cammons Helical Tap & Reamer
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Special reamers for machine tooling

THE CAMMONS-HOAGLUND CO.
MANCHESTER CONNECTICUT

MODERNIZE YOUR MILLS with

Speedmiller

UNIVERSAL MILLING HEADS

2 IMPROVED MODELS

of the Famous

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SPEEDMILLER

Cuts the Cost
of Milling, Bor-
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Adaptable to all
Milling Machines.
More powerfull
Heavier spindles!
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Fully Guaranteed!

Prompt deliveries on Speedmilers, Collets,
Floating Tool Holders, Form Tool Holders,
and Cut-off Tools for No. O and OO B&S.

WRITE for full information, prices,
and Dealerships available.

Veet Manufacturing Co.
EAST DETROIT MICHIGAN



FOOT CONTROL SWITCH



**STREAMLINED
4-SPEED
REAMER
DRIVER**

Complete with motor . . . 4" four-jaw universal machine tool chuck and foot control switch. Capacity from 1/4" to 1 1/2" reamers. Four speeds . . . 30—45—72 and 115 RPM. Higher speed ranges available. Eliminates handwork. Speeds production. Mail your order today. The new Greaves streamlined reamer-driver will come your way— pronto!

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CLEAR

NAMEPLATE MARKING

MODEL No. 4



The nameplate on your product is your signature; keeps it neat and legible! Accurate location and alignment are assured with this **NAMEPLATE DETAIL PRESS.**

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.
1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

Westinghouse Self-Contained Vertical Gearmotor

A self-contained vertical Gearmotor consisting of a high speed motor and speed reducing unit is announced by the Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. Nine different gear combinations ranging from 7.61:1 to 38.9:1 are available.

The Westinghouse Self-Contained Vertical Gearmotor can be obtained in 3 to 50 h.p. sizes for operation on 220, 440, or 550 volts, 3-phase a.c. and 3 to 7 1/2 h.p.



Westinghouse Vertical Gearmotor

sizes for use on 115 or 230 volts, d.c. The unit may be equipped with practically any standard motor in a variety of enclosure types, including open-protected, semi or totally-enclosed, and explosion-proof. The design of the gear case is such that all gears and bearings are said to receive positive lubrication at all operating speeds. The quiet-operating single helical gears and pinions are of 40 to 50 carbon steel and are subjected to a special heat treatment before hobbing.

Ideal Voltage Tester

For testing the continuity of circuits (a.c. or d.c.), 110 to 550-volt alternating current, 110 to 600-volt direct current,

STANDARDIZING ON *Nicholson*

Valves PAYS OFF

MAINTENANCE MEN LIST 5 REASONS

A survey of large users of Nicholson cylinder control valves shows these leading reasons for their specification:

- 1) Special seats, don't cut out.
- 2) Fast, positive acting.
- 3) Stuffing box easily repacked.
- 4) Heavy-bodied, withstand abuse.
- 5) Neat, installed in any position.

W. H. NICHOLSON & CO.

136 OREGON ST., WILKES-BARRE, PA.



Manual, foot, motor, solenoid types for all mediums. Press. to 5000 lbs.

CATALOG 546.

DORMAN FRICTION TAPPER with AUTOMATIC REVERSE

Capacity in steel: No.1 size—2/56 to 3/8".

You don't need two or three different size tappers to handle a wide range of tapping. Nor do you need to hunt for collets to hold different size taps. By tightening one chuck screw of self centering, full floating chuck jaw the No. 1 will drive the above range of taps.

Attaches to all male spindle drills including Walker-Turner, Atlas, Buffalo Forge, Boice Crane, Canedy-Otto, etc., and to Morse Taper Drill Presses.

Also available in two larger sizes to take taps up to 1 1/4" in steel or other tapable material.

Round Split, Button or Acorn Die Holder Assemblies in stock for all size Dorman Tappers permitting their use for external threading.

Write for Die Holder Bulletin



Price No. 1 Size

\$50.00

or

\$44.00

with.

M.T. Shank.

DORMAN MACHINE TOOL WORKS 36 S. Mac Questen Parkway, Mount Vernon, N. Y.



Ideal Voltage Tester

which is said to function in the event the other fails. Firmly anchored 2-foot leads are brought out through the top of the case of the tester, thus making it easy to handle and read.

Sturdily constructed and encased in an attractive streamlined plastic case, the Ideal Voltage Tester includes an easy-to-

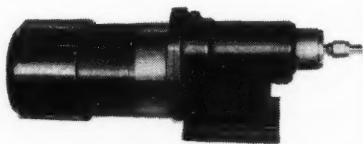
blown fuses, grounded side of line, grounded side of motor or appliance, excessive leakage to ground, frequency (25 or 60 cycles), and d.c. polarity. Ideal Industries, Inc., 1031 Park Ave., Syca-more, Ill., announces the voltage tester shown in the accompanying illustration.

To provide for double protection, indications of relative voltage values are provided by a solenoid indicator and a neon test lamp, either of

read scale calibrated from 110 to 600 volts. The overall length of the unit is 6 inches. The test prods are 2 inches long, and the test prod handles are 4 inches long. The voltage tester weighs 8 oz. and is supplied complete with a carrying case having a belt clip.

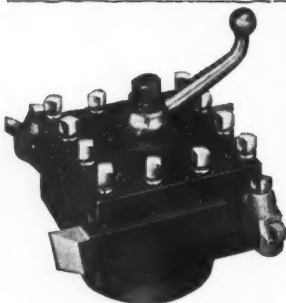
Govro-Nelson High Speed Drilling Unit

The Govro-Nelson Co., 1931 Antoinette St., Detroit 8, Mich., is now offering a high speed drilling unit in two models;



Govro-Nelson High Speed Drilling Unit

namely, Model "J-6" with spindle speed of 6,000 r.p.m. and Model "J-9" with spindle speed of 9,000 r.p.m. Both models are equipped with 3-phase 60-cycle induction



Model 6-S
for 16" to 18" lathes
30 Models
available for lathes
6" to 36" swing.
Immediate Delivery

Write for catalog giving lathe swing and tool size used.

ENCO Precision Turrets

ASSURE YOU ACCURATE WORK BECAUSE —

Enco turrets employ precision spring loaded balls to accurately position each station. Multiple balls and seats insure repetitive indexing to within .0005".

CHECK THESE FEATURES

- All hardened construction.
- 12 position indexing.
- 3 working positions for each tool.
- Vise lock mounting.
- Precise reindexing.
- Ease of operation.
- No chip interference.

ENCO MANUFACTURING COMPANY

DEPT. 12

4522 FULLERTON AVE., CHICAGO 39, ILL.

CONTRACT MACHINE PARTS MFG.

Open Time on Latest Type Equipment:

- Production Automatic Milling Machines and Drill Presses.
- Engine Lathes—up to 24" diameter x 14' Center to Center.
- Toolroom Universal, Plain, Vertical Milling Machines.
- Precision Cylindrical Grinding up to 12" x 36" (Including Internal and Taper).
- Spray Painting of Metal Parts.
- Steel Heat Treating Facilities.

Modern, fully equipped facilities for designing and building Special and Automatic Machinery, Metal Stamping Dies, Special Tools, Jigs and Fixtures. Large assembly floor space in modern steel and brick building.

Inquiries Invited

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OFFICE
SPOTSWOOD
NEW JERSEY

Established 1930

**MARK
IRON,
STEEL
and
CARBIDES**



**THE
Echograph
WAY**

Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

- Write for circulars and prices.

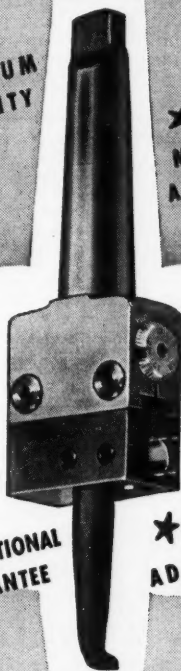
BREWSTER-SQUIRES CO.

Hudson Terminal Bldg. New York 7, N. Y.

The MAXWELL Precision Boring Head

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MAXIMUM
CAPACITY

★
MAXIMUM
ACCURACY



★
UNCONDITIONAL
GUARANTEE

★.0002
ADJUSTMENT

★

MAXIMUM QUALITY

★ **MINIMUM PRICE**

3 sizes from \$44.00 to \$105.00. Boring capacity $\frac{3}{8}$ " to 15". Available with any standard shank. Immediate delivery from stock. Circular upon request.

THE MAXWELL CO.

325 BROADWAY • BEDFORD, OHIO

motors geared to the spindle speeds specified. With an adjustable stroke up to $\frac{3}{4}$ inch and maximum collet capacity of $\frac{1}{4}$ inch, each model is said to be suitable for drilling, reaming, countersinking, spot-facing, and hollow milling.

Design features of the Govro-Nelson High Speed Drilling Unit include ball bearing suspension and free-rolling centrifugal weights. The feeding mechanism operates in an oil bath, with the unit sealed to retain the oil and prevent the entry of coolant. A built-in rate of feed control provides the slow feed required for reaming or faster feeds for other

operations. The spindle is arranged to automatically dwell at the forward end of the stroke for cleaning up purposes in performing countersinking or spot-facing operations. The drilling unit is completely self-contained and may be operated at any angle in single or multiple setups, simultaneously or in sequence with remote electrical controls.



WIRE ROPE CUTTER No. C

Hand Operated.

Price \$112.50. Wt. 110 lbs.
Lever Action.

Made in two capacities:

One for 1" and smaller wire rope. One for $1\frac{1}{4}$ " and smaller wire rope.

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317 East 47th St. New York 17



This TRADE MARK is
Your Guarantee of
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PRECISION

Micro Miniatures Small Precision Ground END MILLS

STOCK SIZES

$\frac{1}{16}$ " - 2 - Flute
 $\frac{1}{8}$ " - 2 - Flute
 $\frac{1}{8}$ " - 2 - 3 Flute
 $\frac{3}{16}$ " - 2 - 3 Flute
 $\frac{1}{2}$ " - 2 - 3 Flute
 $\frac{5}{8}$ " - 2 - 3 Flute
 $\frac{3}{4}$ " - 2 - 3 Flute
 $\frac{7}{8}$ " - 2 - 3 Flute

BALL ENDS
 $\frac{1}{8}$ " - 2 - Flute
 $\frac{1}{8}$ " - 2 - 3 Flute
 $\frac{1}{4}$ " - 2 - 3 Flute
 $\frac{3}{8}$ " - 2 - 3 Flute
 $\frac{1}{2}$ " - 2 - 3 Flute
 $\frac{3}{4}$ " - 2 - 3 Flute
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Special Sizes to Fit Your Job

Also Immediate Delivery

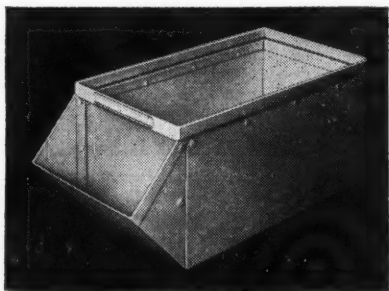
MILLIMETER SIZES 1-2-3-4-MM

Single or Double End All Sizes $\frac{3}{16}$ " Shank.
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Aluminum Stackbin

The Stackbin Corp., Pawtucket, R. I., announces the addition to its line of steel Stackbin portable containers of a bin made of heavy gauge aluminum. Sturdily



Aluminum Stackbin

constructed and unusually light in weight, the aluminum container is of the same individual hopper-fronted design as regular Stackbins and is intended for the storage, transportation, and assembly of tools, parts, and materials.

Stored in Stackracks, any Stackbin is said to be instantly accessible when its contents are needed without disturbing any other bin in the rack.

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PATENT ADJUSTABLE HOLLOW MILLING TOOL

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Carbide tipped blades optional, are quickly interchanged with the high speed steel blades, for cutting the harder or gritty materials.

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THE JOHN M. ROGERS TOOL CORP.

Gloucester City

New Jersey

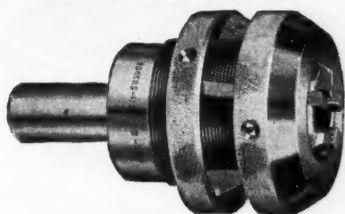


Fig. 20—Shank Integral

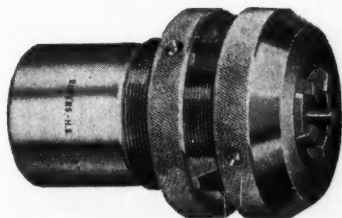


Fig. 23—Arbor Separate

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With the new Dearborn Automatic Indexer connected to a Dearborn Chucking Fixture: chuck is closed automatically; indexed the required number of times automatically; chuck is opened automatically; piece is knocked out automatically.



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Bay Tool and Work Stand

Made with heavy gauge steel shelves and heavy angle iron legs, the Bay Tool and Work Stand illustrated herewith, product of Bay Inc., 3015 N. 16th St., Philadelphia 32, Ill., is said to fill many requirements as a parts and tool container and transporter, tool and work stand in conjunction with operating equipment, assembly line parts container, unit for carrying portable inspection equipment on assembly lines or stock pickup and



Bay Tool and Work Stand

transportation. The stand is finished in olive green baked enamel and is supplied knocked down in a carton together with nuts and bolts for quick assembly.

Available with or without casters, the Bay Tool and Work Stand measures 18 inches wide x 30 inches long and is 30 inches high without casters and 33½ inches high with casters. The unit is offered with a choice of two or three reversible shelves.

Stanley No. 24 Electric Drill

Identified as the No 24, a compact, sturdy, lightweight, small size, portable drill of ¼-inch capacity has been added

CARBOLOY TIPPED SCRAPER BLADES

Especially good for hard alloy iron and extremely hard bronze castings. If you are using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove high-speed blade and slip in the Anderson Carboly Tipped Blade. Available in three widths.

by *Anderson*

THEY LAST 8 TO 10
TIMES LONGER



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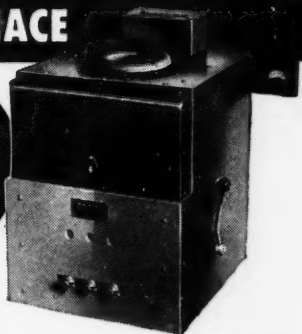
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Hand and Power Hydraulic Presses, Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters.

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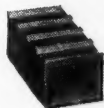
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Protective Atmosphere Furnace
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2634H-1

'Surface'

Standard Rated
FURNACES

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO



to the line of electric tools marketed by Stanley Electric Tools, New Britain, Conn. Suitable for drilling, in metal, wood, and composition materials up to its rated capacity, the drill is $8\frac{1}{2}$ inches long overall and weighs $3\frac{3}{4}$ lb., thus making it handy for working in close quar-



Stanley No. 24 Electric Drill

ters and readily adaptable for service men to carry in their tool kits for installation work and on-the-job repairs.

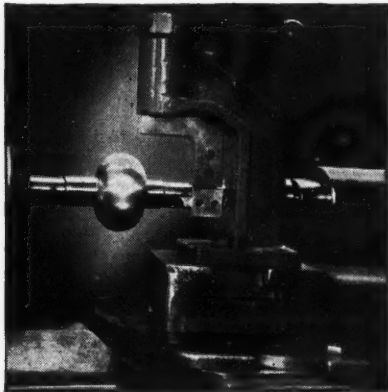
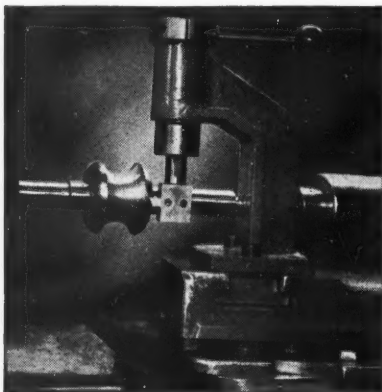
Features of the Stanley No. 24 Drill include a strong aluminum die-cast housing, sturdy and durable gears, trigger-type switch with locking device, three-jaw geared threaded Jacobs chuck, positive cord clamp, and three-wire rubber-

covered cord with spring protector. The tool can be easily converted into a bench drill press by locking the drill in a No. 514 stand.

Vi-Speed Model 610. Air-Operated Vise

A heavy duty air-operated foot-controlled vise designated as the Vi-Speed Model 610 is announced by the Van Products Co., 1520 G. Daniel Baldwin Bldg., Erie, Pa. Equipped with unusually large jaws and designed to provide for a wide jaw opening, the vise is said to permit the positive holding of large castings, forgings, and other pieces. Slight foot pressure on a valve provides for the rapid closing or opening of the vise jaws and locks them in either position.

The design of the Vi-Speed Model 610 Vise includes a convenient air regulator and gage unit which provides jaw pressures ranging from zero pounds to 50 times available air pressure. An adjustable safety screw permits the quick limiting of vise jaw travel, thus preventing complete closure and assuring absolute safety.



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No. 1—Tool made for 9" to 14" Lathes. Price Complete.....\$ 52.00
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When ordering, state "T" slot dimensions—also distance from center line of spindle to top of compound rest. All steel parts case hardened.

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Round boring bars and internal threading
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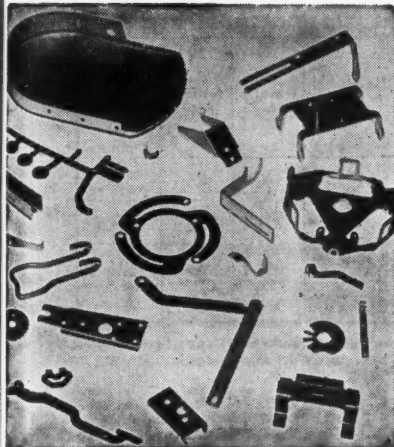
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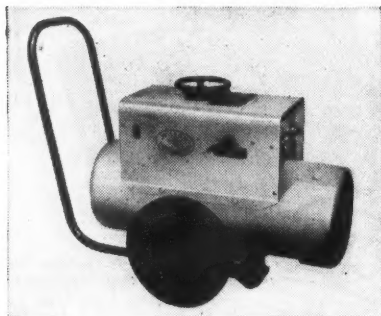
3296 East 80th Street
Cleveland 4, Ohio

NEW • SPEEDY • ECONOMICAL



Wilson "Hornet" 36A Arc Welding Machine

A heavy duty motor-generator arc welding machine designated as the "Hornet" 36A is announced by the Wilson Welder



Wilson "Hornet" 36A Arc Welding Machine

and Metals Co., Inc., Dept. 1609P, 60 E. 42nd St., New York 17, N. Y. Available in 200, 300, and 400-ampere models, the machine is a compactly constructed unit

with simple current control that can be easily adjusted and accurately preset.

Designed for operation on either 220 or 440 volts with no change in relays or additional wires being required for voltage connection, the Wilson Hornet 36A Arc Welding Machine is said to provide a smooth steady current for practically any industrial welding job, and features a weather-resistant totally-enclosed drip-proof construction and special moisture-proof insulation, thus enabling it to be operated under the most adverse conditions, the manufacturer claims.

Whittle Portable Attachments for Electric Hand Drills and Drill Presses

For electric hand drills and drill presses, the J. D. Whittle Co., Small Tools Division, 208 N. Wells St., Chicago 6, Ill., is offering four interchangeable attachments which enable the user to sand, drive screws, polish, grind, file, and saw steel, plastic, and other materials with the same power unit. The attachments are light in weight and can be easily carried from job to job. No spe-

MILLING

BURKE

MACHINES

FOR SMALL, DIFFICULT WORK ON A PRODUCTION BASIS



Above: No. 4 Motor Driven Milling Machine. Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

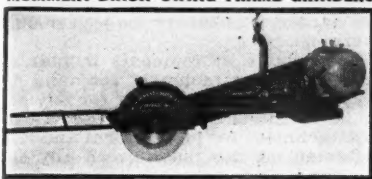
GENERAL SPECIFICATIONS

Mach. No.	Working Surface of Table	Longitudinal Feed	Traverse Feed	Vertical Feed	Maximum Distance between center of spindle and table
1	3 1/2 x 12	8	3 3/8	4 1/2	5 1/4
2	3 3/4 x 16	6	2	4 1/2	5
3	3 1/2 x 12	8	3 3/8	7 1/2	7 1/2
4	3 3/4 x 16	8	3	8	8

Write **TODAY** for complete information, specifications, attachments not shown in above table.

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Sizes 12", 14", 16", 18", 20" and 24" wheels.
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30° 41° 45° and 60° angles with C/L
Shanks—plain, tang drive, tapers

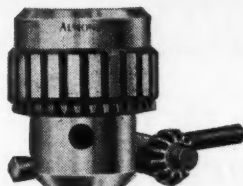
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9" DRILLING AREA
AVAILABLE WITH 2 TO 8 SPINDLES

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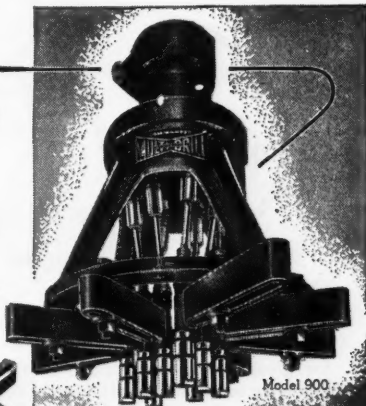
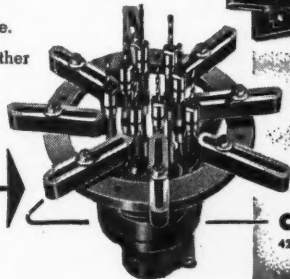
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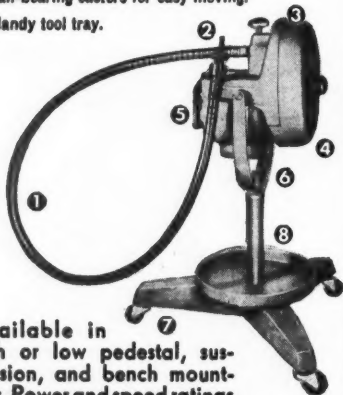
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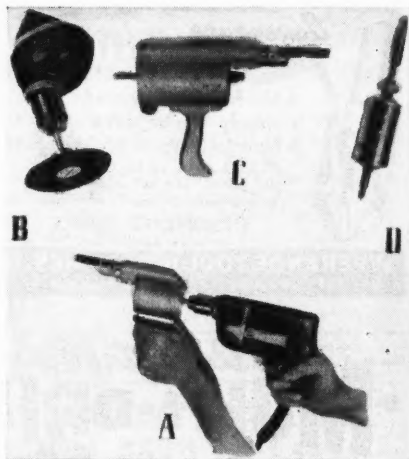
Available in high or low pedestal, suspension, and bench mountings. Power and speed ratings for great range of applications. The most modern flexible shaft machine available—backed by Stow's 72-year quality and performance reputation. Write for full description now, or see this smooth working, smooth looking STOW at your supply house.

STOW

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1 Shear St., Binghamton, N. Y.

cial skill is said to be required to operate them once they are attached. All working parts of the attachments are case hardened to assure long wear under severe usage.

The portable attachments include (A) a saw and file attachment for hand drill only; (B) 3-inch disc sander for any electric hand drill or drill press; (C) saw and file attachment for professional and home craftsman use for insertion in any electric hand drill or most types of drill presses; and (D) screw driver attachment for any electric hand drill or most drill presses. The first mentioned attach-



Whittle Portable Attachments for Electric Hand Drills and Drill Presses

ment is said to convert the regular spinning motion of the electric hand drill into a speedy forward-backward motion for sawing or filing. The 3-inch disc sander is said to be ideal for sanding, grinding, or polishing jobs and is claimed to be particularly useful in close quarters.

The saw and file attachment for professional and home craftsman use is designed to accommodate broken pieces of regular hack saw blades for sawing operations. In performing filing operations, a piece of file having a $\frac{1}{4}$ -inch shaft is inserted in the attachment.

The screw driver attachment includes a screw finder for keeping the screw driver on the screw head, and is designed to accommodate socket bits and Phillips screw driver bits.

TAPERED SPIRAL END MILLS



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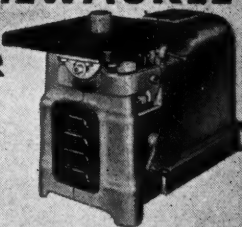
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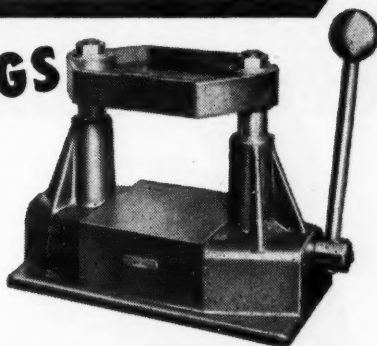
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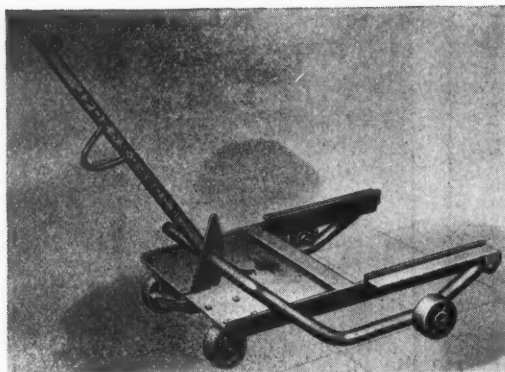


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Lyon-Raymond Tote Pan Lift Truck

Claimed to provide a unique method for lifting and transporting tote pans either singly or in stacks, the Lyon-Raymond Tote Pan Lift Truck illustrated herewith is now being introduced by the Lyon-Raymond Corp., 4592 Madison St., Greene, N. Y. The open forks of the truck are arranged to engage the side handles or lips of tote pans and to lift the entire load by

Lyon-Raymond Tote Pan Lift Truck

a simple downward push of the operating handle. Easy elevation is said to be afforded by adapting the principle of mechanical leverage, using the handle as a lever and the rear wheels as a fulcrum.

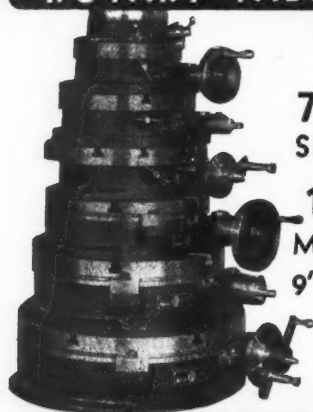
The Lyon-Raymond Tote Pan Lift Truck, which has a capacity of 600 lb., is constructed of tubular and formed steel parts, resulting in a strong, lightweight unit. An automatic lock is provided for holding the load in the elevated position, and a pedal release provides for control of the load during lowering.

Two swivel casters permit the truck to be maneuvered in close quarters with ease.

"Speed-o-matic" Electric Impact Nut Setter

A lightweight, high speed, heavy duty, portable electric, torqueless, impact nut setter designated as the "Speed-o-matic"

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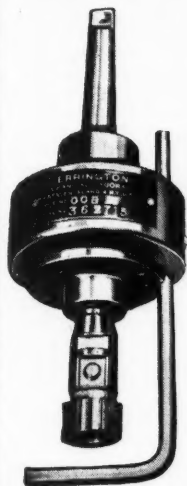
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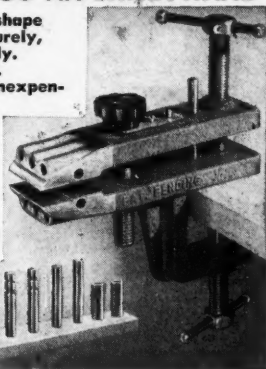
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Guide Makers Since 1920

1418 Walnut Street

Kansas City 6, Missouri

Paddock
BALL-BEARING
BAND SAW GUIDES





"Speed-o-matic" Electric Impact Nut Setter

is now being manufactured by the Illinois Gage & Manufacturing Corp., 4639 W. Washington Blvd., Chicago 44, Ill. According to the manufacturer, the design of the tool is such that it will not twist in the operator's hands when a nut be-

comes tightened, thus providing for maximum ease of operation with minimum fatigue to the operator.

The Speed-o-matic is constructed to operate at high speed, driving a nut or bolt at 1,750 r.p.m. at free speed. At the point of resistance, the impact unit automatically delivers 3,000 impact blows per minute. Operation of the units is instantly reversible for removing bolts or nuts.

Equipped with 25 feet of rubber-covered card and plug with ground wire, the Speed-o-matic Nut Setter is designed for operation on 110 volts, 60-cycle a.c. or d.c. The tool has an overall length of 12½ inches and weighs 13½ lb. It has a capacity for bolts and nuts up to ¾ inch.

Made of Silman steel forgings for maximum durability and equipped with precision ball and roller bearings, the impact unit is the heart of the Speed-o-matic and can be removed in 45 seconds or less if service is required.

Taft-Peirce "A" Accuracy Gage Block Set

The Small Tool and Gage Division, Taft-Peirce Manufacturing Co., Woonsocket, R. I., announces a set of high pre-



A BIG
Time Saver

IN TAPPING
AND REAMING!

Aligning the work with the spindle is usually a tedious, time-wasting job if the tool holder is of the rigid type that requires perfect alignment with the work.

How different the situation, however, if you use a Ziegler Floating Holder instead of an ordinary tool holder! The Ziegler, by compensating for inaccuracies of as much as 1/32" radius or 1/16" diameter, makes it possible to secure fine-tolerance production without perfect alignment of the work with the spindle.

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for Taps and Reamers...

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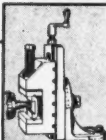
**SOUTH
BEND**

MILL IT ON YOUR LATHE

This Milling and Keyway Cutting Attachment is ideal for shops not having a milling machine. It can be used for milling, boring, keyway cutting and other operations. Mounts on compound rest base of South Bend Lathes.

Lathe Size	Vise Cap.	Price	Lathe Size	Vise Cap.	Price
9"	1-1/2"	\$35	14-1/2"	4"	\$65
10"	1-3/4"	\$45	16"	4"	\$75
13"	2-7/8"	\$55	16-24"	4"	\$75

Write for dimension sheet



SOUTH BEND LATHE WORKS

427 E. Madison St.
South Bend 22, Ind.



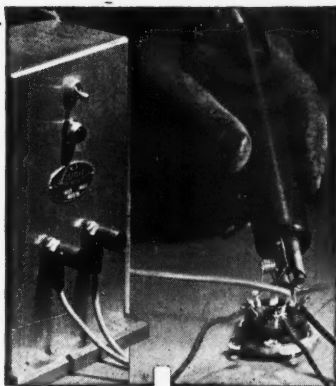
SAVE FLOOR SPACE LIFTING

Yohe racks save floor space, hold more stock, require less lifting. Capable of holding 10,000 and 12,000 pounds for bars 10 to 20 feet long.

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WM. S. YOHE SUPPLY CO.

505 GIBBS AVE., N. E. CANTON, O.



FOR FASTER, SAFER SOLDERING

The Luma resistance method of soldering is the accepted way for small shops requiring single operation to large plants with many types of operations. Write for complete information about this remarkable tool.

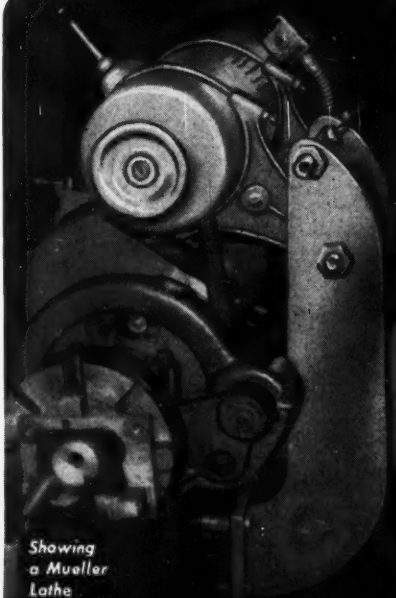
LUMA ELECTRIC EQUIPMENT CO.

P. O. Box 132-M.S.

Toledo 1, Ohio

"Schultes"

... THE KING
OF MOTOR DRIVES!



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a Mueller
Lathe

ALL HELICAL GEARED, UNSUR-
PASSED IN POWER, EFFICIENCY,
SAFETY AND COMPACTNESS

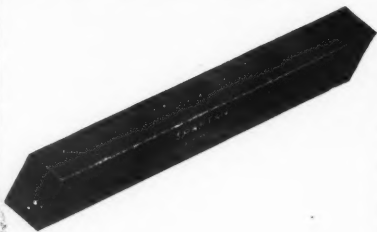
Write for Complete Detailed Specifications

SCHULTES LEVEL, INC.

17403 Gable

DETROIT 12, MICHIGAN

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KUTALL



Sparground

**Heat Treating
Methods That
Are Different**

Try Kutall Tool Bits for general purpose work, and Sparground for extra special jobs.

Sold Through Distributors

SPARTAN SAW WORKS, INC.
SPRINGFIELD, MASS.



Taft-Peirce "A" Accuracy Gage Block Set

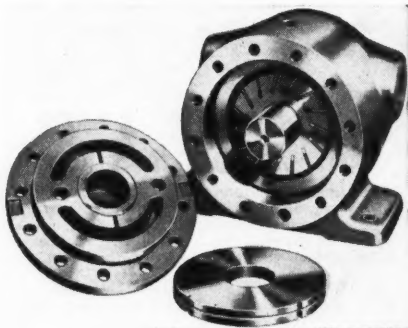
cision "A" accuracy gage blocks which are made from high quality alloy steel and are hardened and seasoned to ensure durability and to retain accuracy.

The set includes a complete assembly of 81 standard sizes of gage blocks, as well as an additional block of 0.10005 inch. The size of each block is plainly marked on the edge for quick identification and easy selection from the case, which is so designed that individual blocks can be readily removed with one hand.

Racine Model J Adjustable Volume Vane Type Oil Hydraulic Pump

Identified as the Model J, an adjustable volume vane type oil hydraulic pump especially designed for use where space is limited is announced by the Racine Tool & Machine Co., 1770 State St., Racine,

Racine Model J Adjustable Volume Vane Type Oil Hydraulic Pump





FORD ROTARY FILES

The Right File for
the Right Job
Three Distinct Types

1. Hand Cut Files
 2. Ground Burs
 3. Carbide Cutters
- Rotary Files Exclusively
for over 25 Years.
Available from your
Mill Supply House,
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NEW Surface Plate V-Blocks, Angle Plate

SURFACE PLATE for laying out, surfacing, checking flat surfaces, etc. Precision ground top. 12" x 17" x 3", top 3/4" thick. **Price...\$37.50**

V-BLOCKS for holding cylindrical parts. Hardened steel. All surfaces precision ground. Size 1-15/16" x 2-15/16" x 2-1/4". Capacity 1/4" to 2". **Price per matched pair...\$32.00**

ANGLE PLATE. Precision ground on six sides. 3-1/4" x 3-1/4" x 4-1/4" with 5/8" V-groove. **Price...\$20.00**



SOUTH BEND LATHE WORKS 427 E. Madison St. South Bend 22, Ind.

Micro Supreme

LAY-OUT AND IDENTIFICATION DYE

12 COLORS*

For Tool, Die, Pattern or Template layout on metal... Quick identification of stock and parts... Shows up in sharp relief—dries instantly—easily removed... Write for circular.

*Purple shipped unless otherwise specified

MICHIGAN CHROME & CHEMICAL COMPANY

6340 E. Jefferson Ave. • Detroit 7, Mich.

Attention! SHOP FOREMEN

specify **Hallowell**

Here is a "Hallowell" Foreman's Desk of Steel—of stand-up height. The top of just the right size and sloped at just the right angle, provides a flat, smooth writing surface. It enables foremen to do necessary desk work and file their cards, records, etc. for ready reference in conveniently located pigeon holes. Many other styles are available to meet your specific requirements. Write now for the "Hallowell" Catalog of Shop Equipment of Steel.

"Hallowell" Products are sold entirely through
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OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

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BOX 556

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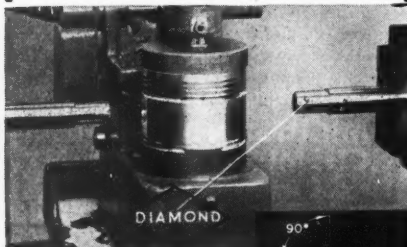


Fig. 2222

Wis. According to the manufacturer, the unit can be installed in an area as small as 6 x 6 inches and, at 1,000 lb. pressure maintains a volumetric efficiency of 90 per cent.

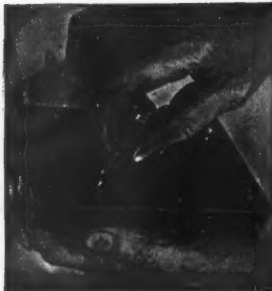
Volumetric output of the pump is controlled by a mechanical movement of the rotor ring. Horsepower requirements may be computed for any given installation according to the volume and pressure needed. The vanes of the pump are made of special steel and are self-compensating for wear. The rotor shaft is mounted on anti-friction bearings. The entire pump is self-lubricated and is available with a foot or flange mounting.

GILMORE DIAMOND BORING TOOLS



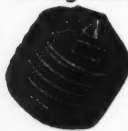
The diamonds in these tools are carefully chosen under strong magnification to make certain they have inherent qualities that render long boring service. • Write for data book on diamonds for Turning, Boring, Testing.

F. F. GILMORE CO. 285 Columbus Ave.
Boston 16 • Mass.
Diamond-Boring, Turning, Facing, Engraving,
Truing Tools, Styli, Gage Contacts.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{3}{8}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

Ingersoll-Rand J-10 Utility Jackhammer

An air-operated rock drill designated as the Ingersoll-Rand J-10 Utility Jackhammer has been announced by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Designed for general utility and plant maintenance work, the drill is unusually light in weight and is said to be easy to handle, thus making it particularly use-



Ingersoll-Rand J-10 Utility Jackhammer

ful on a ladder or scaffold, as well as for overhead work.

The J-10 Jackhammer provides for a strong automatic rotation and utilizes standard jackbits. By using adapters, star drills can be employed for drilling holes $1\frac{1}{2}$ inches in diameter and under. Also, by removing the rotation pawls or using round shanked tools, the unit can be employed as a light paving breaker or for chiseling and channeling. A built-in oil reservoir in the handle supplies ample

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

BLOOMFIELD TOOL CORP.

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Immediate Delivery
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Fast service on specials

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ARTUS ARBOR SPACERS



The **COLOR** tells
the **THICKNESS**

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

CONVENIENT TRIAL OFFER

Handy Spacer Assortment

10 ea.	.001 —	.0125 thick
5 ea.	.015 —	.030 thick

100 SPACERS IN ALL

7/8"	— \$3.10	1 1/4" — \$3.80
1"	— 3.35	1 1/2" — 4.70

Other standard sizes also available.

Illustrated Folder Free.

Immediate Delivery on Spacers, Gaskets, Shims, Large Slitting Saw Spacers.

Industrial Products Suppliers

Dept. M, 434 Broadway, New York 13, N. Y.



Plunger moves away from, instead of against the lever, protecting delicate parts from sudden or excessive jolts. Each graduation on scale represents 1/1000" movement of plunger. \$6.50.

Positive-Lock SURFACE GAGE

Drawbolt has positive lock to prevent slippage. Spindle: 9" x 5/16". Block: 3 1/4" x 2 1/2" x 1" with 90° angle groove in base. \$6.00.

Dealers wanted to sell these tools. If no dealer write for circulars on the Koch Test Indicator and the new toolmaker's surface gage.

ANDREW GENALES

28 SECOND AVENUE, NYACK, N. Y.

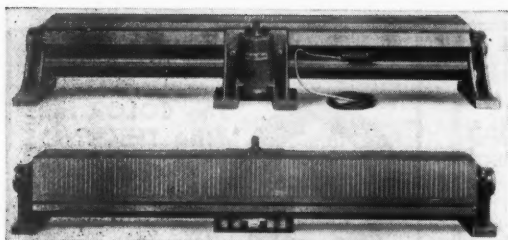
Tel. NYack 2222

KOCH

Test Indicator

Two working ends—one to test outside surfaces, the other inside. For precision work and toolmakers' use.





Walker Apex Swivel Chuck

Walker Apex Swivel Chuck include the complete elimination of moisture leakage, as well as resistance to unusual abuse. The chuck is available in various sizes.

lubrication. Throttled control permits the selection of the proper type of blow for any type of work or tool, including drills, chisels, gouges, and moll points.

Walker Apex Swivel Chuck

A chuck that is designed to provide a magnetic surface over and around corners, to be known as the Walker Apex Swivel Chuck, has been produced by the O. S. Walker Co., Inc., Worcester, Mass. According to the manufacturer, the chuck is guaranteed to provide a 100 per cent magnetic surface, thus enabling small narrow strips, knives, and similar items to be held to the very edge.

Additional features claimed for the

Lapeer Holding Device Kit

A kit of holding devices designed especially for handicapped persons is now being offered by the Lapeer Manufacturing Co., 2006 W. Grand Blvd., Detroit, Mich. By means of these devices, the amputee can lock almost any kind of a tool within the gripping capacity of the device. The locking and releasing of the working tool can be accomplished with the flick of a lever. The gripping pressure is adjustable.

The kit comprises three devices: (1) a vise wrench 7 inches long that can be made to hold any shape of work and may be used for numerous purposes, including a pipe wrench; (2) Knu-Vise pliers with screw driver slot on the spindle to

STERLING DRILL GRINDER



CAPACITY:

$\frac{3}{8}$ " to $2\frac{1}{2}$ " drills.
5" x 9" adjustable table.

MOTOR: $\frac{1}{2}$ hp,
3450 rpm.

NET WT: 250 lbs.

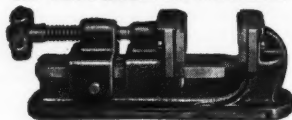
CRATED: 320 lbs.

MCDONOUGH MANUFACTURING CO.

EAU CLAIRE, WISCONSIN, U. S. A.

GEM MACHINE VISES

For TOOL-ROOM or Production.



Six sizes, 3" to 12". Many exclusive features.
You see them everywhere. Write for circular.

J. E. MARTIN MACHINE WORKS
Springfield

Ohio

BEVEL GEARS

PROMPT DELIVERY

UP TO 12" DIAM. - 3 D. P.
CUTTING ONLY or COMPLETE GEARS

LATEST GLEASON EQUIPMENT



Greaves MACHINE TOOL CO.

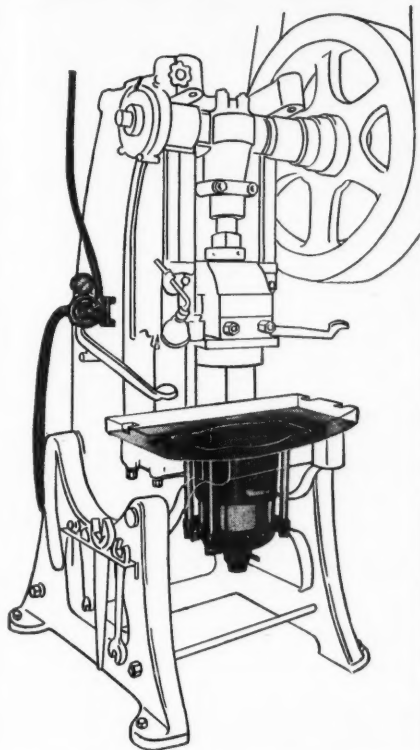
80 2015 Eastern Ave.
Cincinnati, Ohio



DIE CUSHIONS

for every

PUNCH PRESS REQUIREMENT

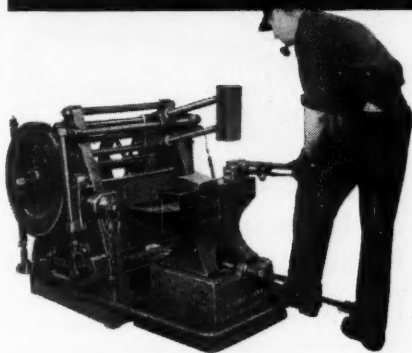


Adaptable to all deep drawing operations and all pressure pad controls on a large percentage of forming dies.

Write for catalog No. 100-12.

DAYTON ROGERS
Manufacturing Company
Minneapolis 7, Minnesota

FOR BETTER SLEDGE WORK AT LESS COST



The McKiernan-Terry Blacker Hammer delivers sledge-hammer blows *exactly* the way the smith wants them—light or heavy, fast or slow, on any part of the anvil. It enables the smith alone to accomplish more and better work than he can with human helpers. More operations per heat, more precision, less confusion. Send today for Blacker Hammer Bulletin No. 56 giving full information about this direct-gear, electric - motor - driven power hammer — how it can save you time, reduce costs, increase anvil capacity.



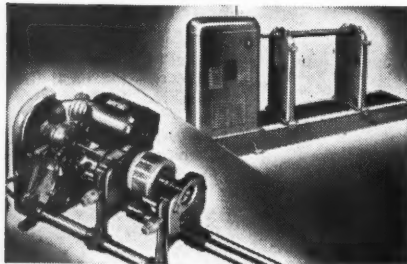
McKiernan-Terry Corp.
Manufacturing Engineers
14 PARK ROW
NEW YORK 7, N. Y.

McKiernan-Terry
**BLACKER
HAMMER**



See for Yourself how Bear Dy-Namic Balancing "LICKS" Vibration Problems!

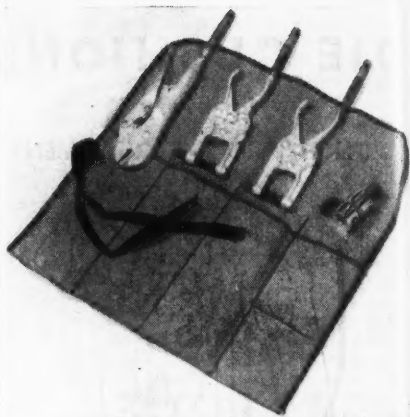
Here is your chance to actually SEE how Bear Dy-Namic Balancing cuts maintenance cost and increases sales-appearance of your products by eliminating wear and noise caused by vibration. You can learn how thousands of leading manufacturers have overcome vibration problems with Bear Dy-Namic Balancing. We will be glad to arrange a demonstration of Bear Dy-Namic Balancing in Action for you. Just drop us a line TODAY! BEAR MFG CO., Dept. M-25, Rock Island, Illinois.



Bear Dy-Namic Balancers are available for balancing rotating objects from a few ounces to several tons.

2444MMSR

BEAR
COMBINATION
STATIC AND DY-NAMIC BALANCING MACHINES



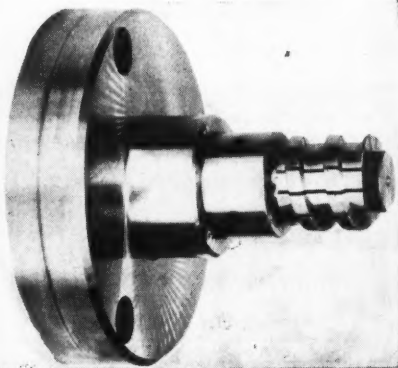
Lapeer Holding Device Kit

facilitate the adjustment of pressure to accommodate varying thicknesses of work held; and (3) Flexi-Grip pliers which require no presetting and has a spindle that automatically adjusts itself to varying thicknesses of materials held up to $\frac{3}{8}$ inch. Also included in the kit is an adapter which can be screwed to any artificial arm, as well as a wing screw that can be made to hold the tool in use.

Erickson Special Grinding Fixture

The accompanying illustration shows a special grinding fixture developed by the Erickson Tools Division, 2309 Hamilton

Erickson Special Grinding Fixture



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...for more than
1001 jobs

• The Hjorth Lathe has the speed, accuracy, handling ease and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

HJORTH LATHE & TOOL CO.
8 BEACON STREET WOBURN, MASS.

**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

NIELSEN TOOL & DIE COMPANY
1960 W. Eleven Mile Rd.
Berkley, Mich.

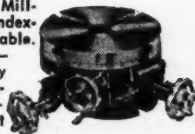


This PALMGREN

No. 000 ANGLE VISE for
Milling, Drilling, Grinding, Etc.
Solve Difficult Angle Jobs.
Get QUICK, ACCURATE,
SET-UPS and save time,
money, rejects. Accurately
machined and graduated
to full 90°. Also use
horizontal. Steel Jaws
2½" plain or grooved.

Combination—Can't Be Beat!

No. 83 ROTARY TABLE
With Dual Cross Feeds
For Drill Press, Lathe or Milling Machine. Combines Indexing, Milling and Rotary Table. Accurate and speedy — strong and sturdy. Rotary Feed calibrated in degrees, cross feed in thousandths. Low price. Get facts.



Immediate Delivery—Write for Circular 351
CHICAGO TOOL AND ENGINEERING CO.
3399 S. Chicago Ave. Chicago 17, Ill. Phone-Saginaw 9675

HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet
And See How You Can
Improve Your Production.*

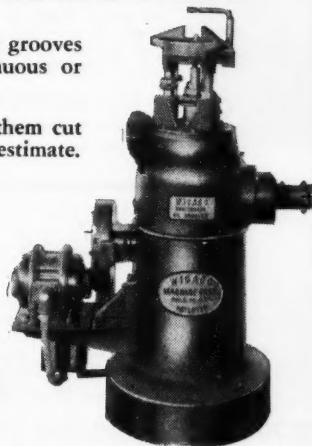
WICACO

**SINCE
1868**

MACHINE CORPORATION

WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of Precision Machinery and Machine Parts



Ave., Cleveland 14, Ohio. The design of the fixture includes an Erickson 18-A-1 special faceplate, expanding mandrel which is so arranged to hold the major diameter of an Acme thread on the inside diameter. The mandrel is drawbar operated and is equipped with locators.

"Skelton" Reamers

The line of "Skelton" reamers formerly marketed by the Lipe-Rollway Corporation has been acquired by the Onondaga Tool Corp., P. O. Box 187, Fayetteville, N. Y. The line includes a roughing taper



"Skelton" Roughing Taper Reamer

reamer, the construction of which is unique in that its two cutting edges are ground radial on a taper to correspond with the hole to be reamed. The two opposite edges are "backed off" sufficiently to allow for the proper thickness of chip.



GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award
Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

This "safety edge" is said to prevent the blade from "hogging in" or chattering.

Also included in the line is a helical finishing taper reamer which is designed to produce a very smooth and round hole.



"Skelton" Helical Finishing Taper Reamer

The tang of the tool is designed to fit into a slot in the holder over which is forced a sleeve having an inside diameter that is sufficiently larger than the reamer shank to allow the reamer to float. A pin passing through holes in the shank and tang of the reamer is said to prevent the reamer from pulling out of the holder.

"Peelcote" Protective Coating

"Peelcote," a protective coating for metal parts which can be quickly and easily peeled off after it has served its purpose, has been developed by The Watson-Standard Co., 225 Galveston Ave., Pittsburgh 12, Pa. The product is an air-drying coating designed to protect metal parts from scratches, chips, and corrosion during shipment, storage, handling, and some types of fabrication. Applicable by the spray or dip method, the material is said to dry quickly and can be easily and cleanly removed by pulling it off of the coated surface.

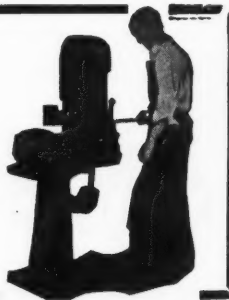
According to the manufacturer, Peelcote is a vinyl-based coating with complete chemical inertness, and is available in clear transparent or solid hiding black.

Centerless POLISHER BUFFER SURFACER

Polisher, buffer, surfacer and vertical or horizontal belt grinder, with centerless feed are all combined in the "PRODUCTION" TYPE S machine. Ideal for cylindrical polishing or straight line finishing on flat work. Can be used for anything that can be ground or polished—metals, rubber, fibre, wood, etc.

Write for Illustrated Folder

PRODUCTION MACHINE CO. • GREENFIELD, MASS.



Lyon-Raymond Single-Stroke Lift Truck

A single-stroke lift truck for use with skid loads up to 2,500 lb. is announced by the Lyon-Raymond Corp., 4488 Madison St., Greene, N. Y. Features of the truck include maximum underclearance for negotiating ramps, and lightweight, both of which are provided by a unique single-frame design incorporating the use of heavy gauge formed steel plate. To ensure easy rolling, the truck is equipped with 8-inch diameter front wheels having Timken roller bearings.



Lyon-Raymond Single-Stroke Lift Truck

Additional features of the Lyon-Raymond Single-Stroke Lift Truck include a 180-deg. operating radius, push-button action to engage the lifting device, safety lock on the handle to prevent injury to operators, and built-in hydraulic release check. The truck is available in a wide range of sizes for use with all popular size skid platforms.

Shearcutter Circular Cutter Bit

A circular cutter bit for use on lathes, screw machines, and boring machines in performing boring, turning, and facing



Model
"400"



**HORIZONTAL
or VERTICAL**

**4"
ABRASIVE
BELT GRINDER**

Eliminate costly hand filing, grinding, deburring and many other operations . . . There are "101" applications for the 400 in your plant. Write for bulletin.

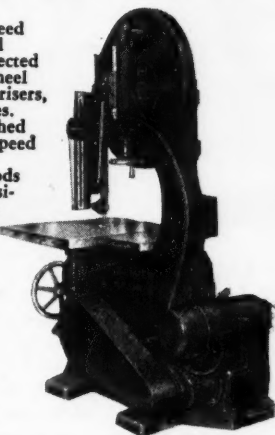
Hammond Machinery Builders

1615 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

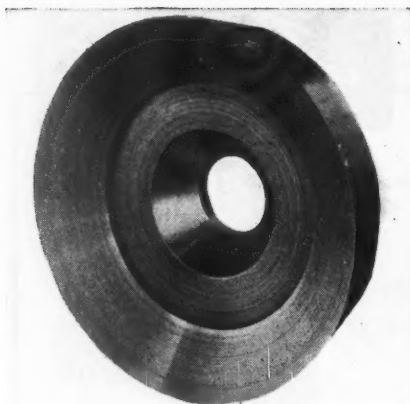
"OLIVER" 36-inch Metal Cutting BAND SAW

Has low speed geared head direct connected to lower wheel for cutting risers, gates, sprues. Also furnished with high speed motor for sawing woods and compositions, sheet metals, etc. Powerful, sturdy . . . cuts true and steady. Has quick-change rim and tire.

Write for
Bulletin
116-S



Oliver Machinery Co., Grand Rapids 2, Mich.



Shearcutter Circular Cutter Bit

operations has been added to its line of Shearcutter tools by the Shearcut Tool Co., Box 746, Reseda Post Office, Los Angeles, Calif. Made from high quality high speed steel, the bit is constructed for firmly fastening to the end of a specially designed holder and utilizes a newly de-

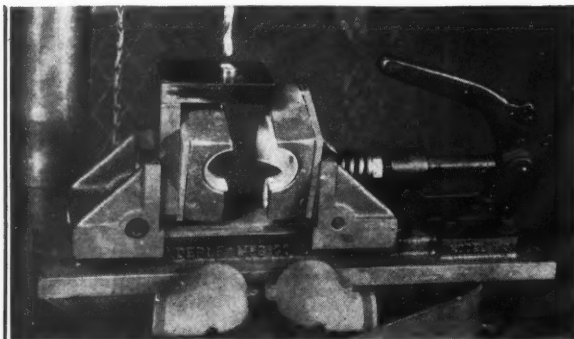
veloped technique in cutting metal. The penetration angle is such that a shearing action is attained and, as a result, mirror-like finishes are produced with a minimum of friction heat, it is stated.

An outstanding advantage of the Shearcutter Circular Cutter Bit is that from 20 to 50 new sharp cutting edges may be presented to the work by simply rotating the bit, thus eliminating the necessity of stopping production at frequent intervals to resharpen the cutting tool. When resharpening becomes necessary, the circular bit is removed from its holder and can be resharpened in one minute, it is claimed. Scientifically preformed for optimum cutting, the bit is said to provide an unusually long cutting life due to the shearing action and the manner in which the chip removed in cutting slides back over the cutting edge, thus tending to keep it sharp.

keep it sharp. The bit can be obtained singly or in a set comprising a boring bar, two circular cutter bits, and a wrench.

Hobart No. 111HT Electrode

The Hobart Bros. Co., Hobart Square, Troy, Ohio, announces the Hobart No. 111HT, a shielded arc welding electrode



EQUI-GRIP Speed Vise

for the

DIFFICULT JOBS

This split, die-cast elbow required drilling at a precise location and angle, directly over the split of the casting.

Note:

1. The wide retraction of jaw for ease in loading and unloading.
2. The speed of action. Move handle to right to clamp and LOCK jaws.
3. The PRESSURE CONTROL. Once set for a production run every piece is gripped firmly without distortion by excessive pressures.
4. Absence of guide pins. Accurately machined dove-tail ways, easily adjusted for wear, hold jaws at original alignment.

WE CAN HELP YOU WITH YOUR PRODUCTION HOLDING PROBLEMS.

Write for a Demonstration—No Obligation.

GEORGE - ANDERLE MANUFACTURING CO.

2116 SALEM AVENUE

DAYTON 6, OHIO

designed for the downhand welding of low alloy high tensile steels, including the production of deep groove, positioned, and horizontal fillet welds. The forceful spray type arc is said to make the electrode unusually easy to handle, and the spatter loss is claimed to be very low, thus resulting in a high rate of metal deposit. Slag can be easily removed.

According to the manufacturer, the Hobart No. 111HT Electrode produces welds having a tensile strength of from 70,000 to 80,000 p.s.i., yield point of 65,000 to 70,000 p.s.i., and elongation of 25 to 30 per cent. The electrode is available in $\frac{3}{8}$ and $\frac{1}{2}$ -inch diameters and in 18-inch lengths. It can be used with either direct or alternating current.

J & J Lift Hook

Designed to provide for maximum convenience and safety in handling dies and other heavy objects, the J & J Lift Hook as shown in the accompanying illustration is now being produced by the Forge and Machine Division, The Johnston & Jennings Co., 877 Addison Rd., Cleveland 14, Ohio. The hook, forged from chrome-nickel steel, is oil quenched and drawn for maximum toughness. The bolt, which



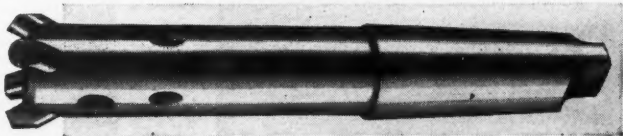
J & J Lift Hook

has a knurled ring to facilitate hand turning, is fabricated from chrome-vanadium steel, oil quenched and drawn for maximum strength and toughness. The self-cleaning threads are ground after heat treating, and the bolt is Magnaflux tested as a precaution against invisible flaws.

The hook and bolt form a complete unit and cannot be disassembled, thus pre-

ANNOUNCING New Erickson - State Boring and Reaming Tools

Erickson adds precision methods to the manufacture of these proven, widely known production tools. The patented State 4-cutter principle permits heavier feeds at higher speeds and delivers more pieces per grind than single-point or double-cutter tools. More regrinds; less adjusting time; accurate, clean holes.



Sizes for range of $1\frac{1}{8}$ " to $5\frac{1}{4}$ ". Ask for our Bulletin "D-2"

Also, the Erickson-State adjustable core drill for heavy duty applications involving excessive chip problems. A heavy hogging, chatterless replacement for fixed core drills. Fast operation and accurate, uniform results realize a new low cost per hole. Sizes for range of $1\frac{1}{8}$ " to $5\frac{1}{4}$ ".

Learn how these two companion Erickson - State tools can cut costs for you. They can be adapted to many special requirements up to $5\frac{1}{2}$ " boring diameter. We shall be glad to design special bars.



Write for our catalog.

Made by
**ERICKSON TOOLS
DIVISION**

2301 Hamilton Ave.
Cleveland 14, Ohio

WESTLEN REELS

*Adjustable
Self Centering*

For feeding flat and wire coil stock up to 12" in width, with a maximum coil weight of 500 pounds. The inside diameter of coil is adjustable, ranging from 11" to 20". The outside is 28" but larger rings may be secured if desired. Coils may be centered and special features eliminate tipping and backlash. Machine is equipped with brake and ball bearings.

Reel is quickly convertible to either vertical or horizontal position. Adjustable spider prevents kinking or crossing while unwinding.

Send for literature.



The RULETA Co.
27 WARREN ST. NEW YORK 7,

MARVECO LIVE CENTERS

- HIGH SPEED
- LONG LIFE
- HEAVY DUTY



MARVECO guaranteed to outperform and outlast any other live center. Write for free catalog, "The Marvels of Marveco."

**SEND US
YOUR CENTER PROBLEMS**

MARVEL TOOL & MACHINE CO.

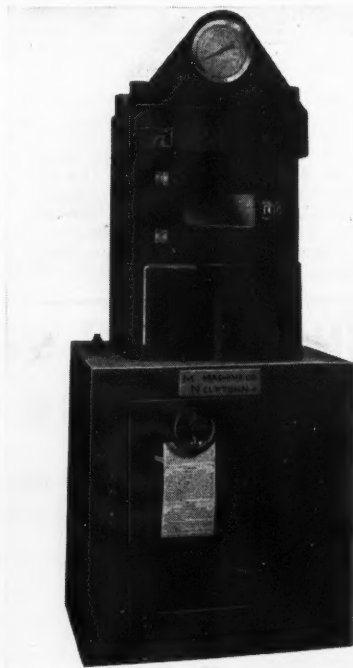
3401 E. McNichols Road, Detroit 12, Mich.

venting the substitution of low strength bolts. As an added safety precaution, the assembly is proof tested at twice its rated capacity before shipment.

The J & J Lift Hook is furnished in four standard sizes having rated lifting capacities of 3, 6, 9, and 15 tons and bolt diameters of $\frac{3}{4}$, 1, $1\frac{1}{4}$, and $1\frac{1}{2}$ inches.

M & N Die-Shearing Press

A die-shearing press for use in blanking, forming, and embossing dies is now being produced by the M & N Machine



M & N Die-Shearing Press

Tool Works, Inc., 144 Orono St., Clifton, N. J. Designed to reduce to a minimum the time required in the shearing of dies, the press is sturdily built and is of all-steel construction.

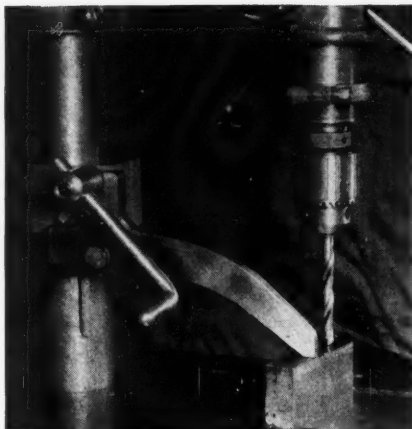
Entirely self-contained, the M & N Die-Shearing Press includes a pump and motor in the base and is completely made so as to require a minimum of floor space. The press is supplied ready for

operation upon connection to the user's power line. The unit can be built in practically any size and capacity.

Circle R Tungsten Carbide-Tipped Circular Saw

The Circular Tool Co., Inc., Providence 5, R. I., announces the addition to its line of Circle R products of a tungsten carbide-tipped circular saw for use in performing a wide variety of metal-cutting operations.

The saw, which has square and radius cutting tips, is available in sizes of from 2½ to 10 inches in diameter. The diameters from 2½ to 4 inches are supplied as thin as ⅛ inch and, upon request, extreme thinnesses can be furnished. The tolerance on all saw sizes is said to be plus or minus 0.00025 inch.



Glantz "Deluxe" Model Drill Clamp

Glantz Drill Clamp

A drill press clamp which is said to be simple to operate, safe to use, and easy to apply to the work has been developed by the Glantz Manufacturing Co., 626 N. Minden Ave., Minden, Neb. The clamp is available in two models, the "Deluxe"

being designed to fit over the column of the drill press and the "Universal" for fastening to the table of the drill press.

The Glantz Drill Clamp can be used for holding round, odd-shape, and other pieces which are difficult to handle, as

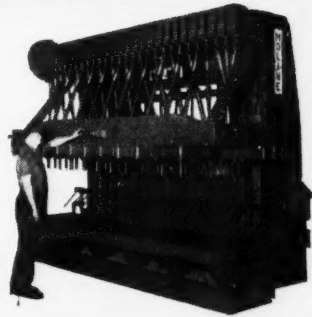


- ★ At greater Man-Hour SAVINGS
- ★ At higher rated EFFICIENCY
- ★ At finer, effortless PRECISION

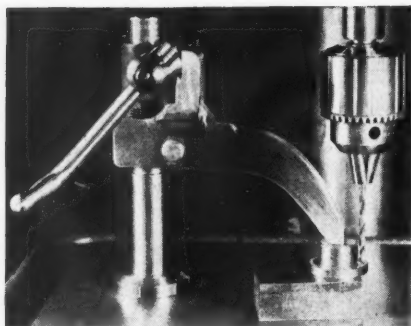
A Moline Multiple Spindle Specially Designed Machine Tool can do your job better at less cost. Ruggedly built to fit your INDIVIDUAL requirements in such operations as Boring—Straight Line Drilling—Universal Adjustable Spindle Drilling—Honing—Tapping—Reaming—Counterboring—Special Milling—these machines are based on years of experience accumulated since 1901.

For your SPECIAL problem go "Hole-Hog" and write us for any information you may need.

No. HU68 DRILLER



MOLINE TOOL COMPANY
100 20th Street Moline, Illinois



Glantz "Universal" Model Drill Clamp

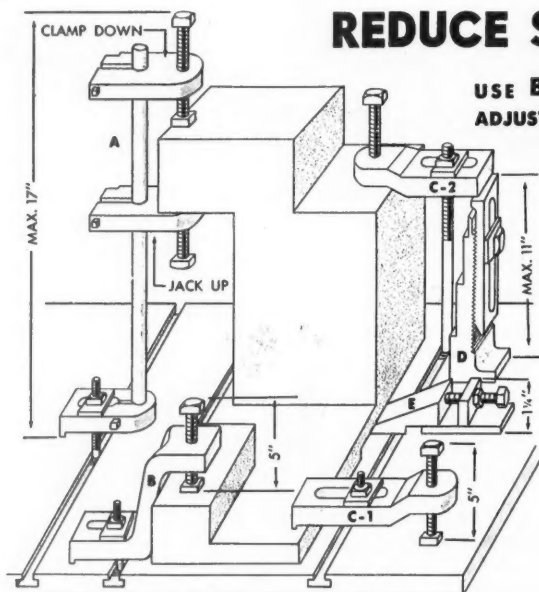
well as for a stop. To operate the clamp after it is installed on the drill press, the actuating arm is simply placed on the piece to be held and the operating handle turned clockwise until the clamp is sufficiently tight to hold the piece firmly. To loosen the clamp, the handle is turned in a counterclockwise direction. When the clamp is not in use, the actuating arm can be simply swung to one side, out of the operator's way. The Universal

Model is said to be adequate for all drilling requirements from $\frac{3}{4}$ inch and down, for all drilling requirements from $\frac{1}{2}$ inch and down.

Vande Metallizing Gun

A metallizing gun embodying features which are said to provide for the unusually fast and thorough application of metals such as steel, aluminum, zinc, lead, bronze, copper, nickel, and so on, is now being introduced by the Vande Manufacturing Co., 1837 S. Michigan Ave., Chicago 16, Ill. According to the manufacturer, the gun completely eliminates backfire. Its nozzle incorporates a new development for mixing the gas and oxygen at the point of combustion. Each wire nozzle is specifically designed to provide the exact volume for the gas used (acetylene, propane, or other gas).

An additional feature of the Vande Metallizing Gun is a finger-tip turbine control which comprises a compound turbine containing a rotor and starter responsive to opposing propulsion fluids. One propulsion fluid jet remains in a fixed position in the primary turbine. A second jet is directed by a control lever in



Difficult Set-ups MADE EASY

REDUCE SET-UP COSTS

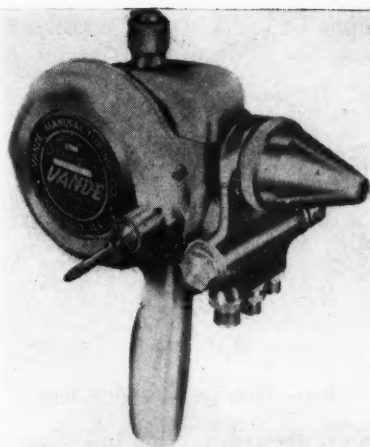
USE BRIDGEPORT TIME SAVING
ADJUSTABLE CLAMPS . . . ADJUSTABLE
STEP BLOCKS . . . AND
TABLE JACKS

Save Labor—Faster Set-Ups—
Safer—Eliminates Shims and
Block Building—Positive Clamp
Security.

- A—ADJUSTABLE CLAMP JACK. Clamp Down and Jack Up.
 - B—ADJUSTABLE TABLE CLAMP TC-1—5" Adjusting Bolt.
 - C-1—ADJUSTABLE TABLE CLAMP TC-2—5" Adjusting Bolt.
 - C-2—ADJUSTABLE TABLE CLAMP TC-2—Reverse Position.
 - D—ADJUSTABLE LADDER BLOCK—Max. Height 11".
 - E—ADJUSTABLE TABLE JACK—The only Jack that Starts from Zero.
- Send for descriptive material and prices.

HARDWARE SALES CO.

1969 North Avenue
Bridgeport 4, Conn.



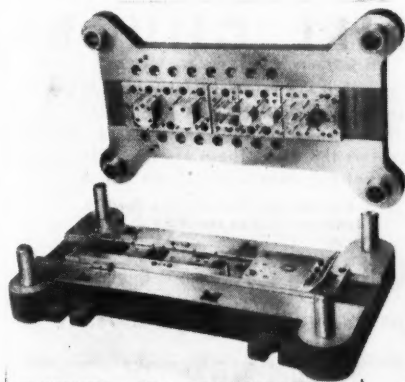
Vande Metallizing Gun

the secondary turbine and either reduces or increases the primary turbine speed, thus affording complete wire feed control at all times.

Crescent Lamination Dies

A complete line of precision-made lamination dies for manufacturers of electric motors and other electrical products is now being offered by the Crescent Tool and Die Co., 1780 Southfield Rd., Lincoln Park 25, Mich. The dies are made to users' specifications or designed from part

Crescent Lamination Die



WENDT-SONIS

*Line of
Reamers*
IS COMPLETE

Carbide
full length
flute reamers
— straight or
taper shank

- COMPLETE RANGE OF SIZES
- WIDE SELECTION OF STYLES
- HARDENED STEEL SHANKS
- ADVANCED DESIGNS

The W-S line of reamers is so complete that they can meet practically all your reaming requirements. For example, W-S Straight Shank Reamers style SSR are available from stock in 37 sizes ranging from $\frac{1}{8}$ " to $1\frac{1}{2}$ ". Similar ranges of sizes are available in 12 other types of standard reamers. Quick delivery on standard reamers with special diameters and tolerances. You get longer wear — greater accuracy when you select Wendt-Sonis Reamers for your requirements. Write today for FREE W-S Speed and Feed Calculator. Address WENDT-SONIS COMPANY, Hannibal, Missouri, — 580 North Prairie Ave., Hawthorne, Calif. — 1361 West Lake St., Chicago, Ill.

Left Hand Spiral
Reamers

Right Hand Spiral
Reamers

Carbide Tipped
Reamers, Straight
or Taper Shank

Jobber Reamers
Straight or Taper
Shank

Stub Screw
Machine Reamers

Shell Reamers

WENDT-SONIS

CARBIDE TIPPED CUTTING TOOLS
Boring Tools • Centers • Counterbores •
Spotfacers • Cut-Off Tools • Drills • End
Mills • Fly Cutters • Tool Bits • Milling
Cutters • Reamers • Roller Turning Tools
Special Bits

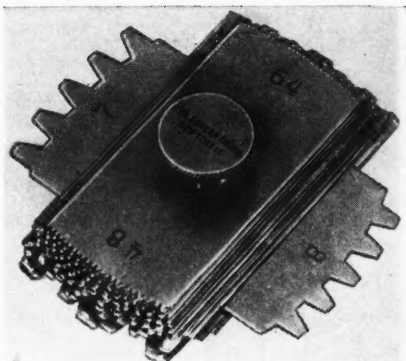
prints, and are said to be held to dimensions as close as 0.0005 inch.

A typical Crescent lamination die is the 7-station progressive unit shown herewith. This die is sectionally ground to unusually close tolerances and is designed to produce laminations for both rotor and stator parts of an electric motor.

Scherr Gear Gage Paper Weight

A gear gage paper weight for gear manufacturers and users, engineers, designers, mechanics, estimators, and others is now being introduced by the George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y. The unique device provides a beautifully finished paper weight combined with a set of gear gages made of high polished stainless steel. As illustrated, the set consists of 12 leaves which include 24 different gear shapes of the following diametrical pitches: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 36, 40, 48, and 64.

According to the manufacturer, the teeth are of the correct involute shape machined with the aid of special fixtures using the Fellows gear shaper generating method. The segment blanks of each pitch are first turned in fixtures to con-

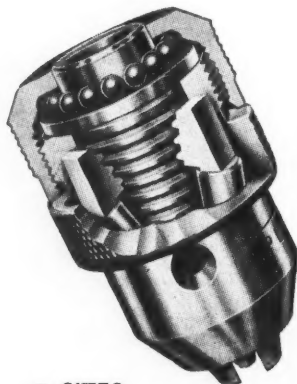


Scherr Gear Gage Paper Weight

form to the full diameter in accordance with the number of teeth for the full circle.

The gear gages, which may be used for the quick checking of gears, are made in $14\frac{1}{2}$ -deg. pressure angle, however, if desired, may also be made to order in 20 deg. and circular pitch. Other shapes or templete, concave or convex forms can be furnished on special order.

Save Effort . Save Time . Boost Output



5 SIZES
FOR NO. 0
TO $\frac{5}{8}$ " DRILLS

Ettco KEYLESS

**SELF-TIGHTENING
DRILL CHUCKS**

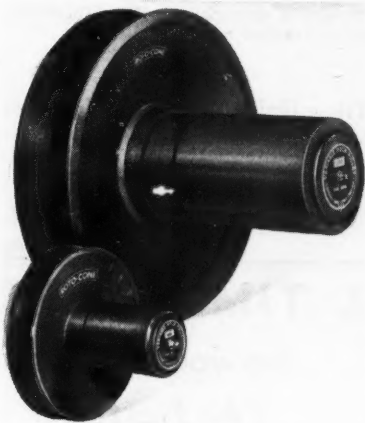
By eliminating the key, Ettco chucks save energy, and speed up drilling. They hold drills rigid, tight, and true—drilling action tightens the grip and centers the drill. There are no better chucks made. Get full details in Bulletin No. 6.

See the full line of Ettco Tools
demonstrated at the A.S.T.E. Show

ETTCO TOOL CO.
598 Johnson Ave., Brooklyn 6, N. Y.

Roto-Cone Variable Speed Pulley

A variable speed pulley in horsepower ratings from $\frac{1}{8}$ to $7\frac{1}{2}$ is now being produced under the trade name of Roto-Cone by the Gerbing Manufacturing Corp., 154 E. Erie St., Chicago 11, Ill. The design of the pulley includes a double rack and pinion to keep the movement of the two sheave faces equal and opposite at all times. A single spring provides the necessary pressure for proper belt tension. According to the manufacturer, a constant belt center line is maintained, thus allowing the use of a V-groove driven sheave. The double rack and pinion design, together with electronic balancing of the complete unit after assembly, is



Roto-Cone Variable Speed Pulleys

said to provide for the elimination of noise and chatter.

Designed for mounting either vertically or horizontally, the Roto-Cone Variable Speed Pulley is said to deliver infinite speed variations within a 3 to 1 ratio in all sizes except the $\frac{1}{8}$ h.p. size which provides a $2\frac{1}{2}$ to 1 ratio. The accompanying illustration shows $\frac{1}{8}$ and $7\frac{1}{2}$ h.p. rated pulleys.

Davis Wizard Toolrak

Of interest to users of hand tools is a shop accessory now being produced by the Davis Development Co., 348-78 First National Bank Bldg., Colorado Springs, Colo., which is designed to keep tools in order while making them available for use. Designated as the Davis Wizard

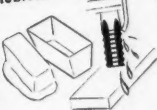
TAPPING TIPS

From Woody Spencer's Notebook

Well Greased Pans and Well Greased Taps Turn Out Beautiful Jobs



Happened in the kitchen the other day when m' wife was doin' the Christmas bakin'. Noticed how careful she was when she greased the pans and what beautiful stuff those well greased pans turned out — no sticking, no crumbs, just smooth, clean, appetizing loaves and cakes. O' course, it got me thinkin' about taps and what a beautiful job you can do with a well lubricated tap. Only difference is, different materials need different lubricants. But that's easy. My Handy Tap Guide tells you just what kind o' lubricant for every kind o' job. Usin' it you can be pretty sure o' turnin' out a beautiful tappin' job. Send for one and try it.



These Tapping Tips of Woody's are not intended as any technical advice on tapping. They're just random thoughts, hints and short cuts Woody has gathered in his years around the shops. He is passing them on in the hope that they will help smooth out some routine job so it will go easier and faster.

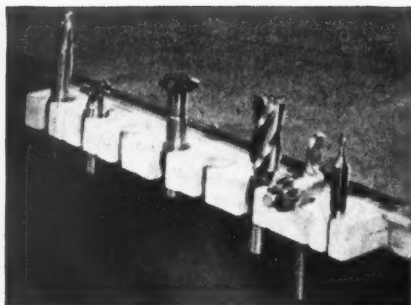
For the specific problems that frequently come up, consult our engineers. Send in complete data on the job—material, depth, diameter, lubricant, whether the hole is through or blind. Our engineers will be glad to make recommendations without obligation.

Note—Woody Spencer's Tapping Tips will appear here as regularly as "Woody" gets time to write them up. Look for them.



THE RIGHT TAP AT THE RIGHT TIME

The Wood & Spencer Company
Cleveland 3, Ohio



Davis Wizard Toolrak

Toolrak, the unit consists of a variety of hardwood blocks which slide in a shaped aluminum back strip. The blocks are variously drilled, counterbored and slotted to hold most of the types of small tools in common use.

Standard back strips range from 36 to 8 inches in length, and 31 different types of blocks are available which can be combined in any of the back strips to suit individual needs. Since the blocks slide into the back strips, they can be arranged

in any sequence desired and rearranged as often as necessary.

Westinghouse Flexarc Carbon Arc Torch

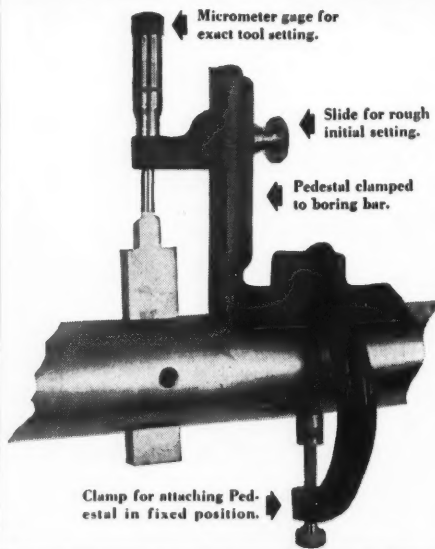
A carbon arc torch for brazing, soldering, and supplying heat for light forging, preheating before welding, and tempering operations has been placed on the market by Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Penna.

Each torch comes complete with two ten-foot extra flexible welding cable leads attached; one pair $\frac{1}{4}$ -inch by 6-foot carbon electrodes; and one pair $\frac{3}{8}$ -inch by 6-foot carbon electrodes. Leads are equipped with bayonet attachment plugs to fit the Westinghouse WT Midget Marvel and limited input welders.

Trico Unbreakable Bottle Oiler

A visible unbreakable automatic bottle oiler specially designed for use where space between the oil hole and machinery is limited is now being marketed by the Trico Fuse Manufacturing Co., 2948 N.

HERE IS A REAL TIME-SAVER!



... AND WORK-SAVER, TOO!

The Bartelt Pedestal Micrometer

Enables you to set boring tools *accurately* from the bar diameter—eliminates common cut-and-try methods. Permits quick micrometer height measurements from flat or round surfaces. Can be used as a production-inspection tool with a wide range of settings. Ideal for jobbing shop and toolroom mechanics. Quality construction, moderately priced—sold direct-to-you by the manufacturer. All components precision machined of high grade materials and carefully assembled. Packed in carrying case with necessary accessories. Made in eight models for various applications. Write today for literature and direct-to-you prices.

BARTELT ENGINEERING CO.

1216 Partridge Ave.

BELOIT

• WISCONSIN



Trico
Unbreakable
Bottle Oiler

5th St., Dept. MMS,
Milwaukee 12, Wis.
The feed spout is ar-
ranged to the side,
thus making it possi-
ble to mount the oiler
where clearance is as
small as $\frac{3}{4}$ inch.

The Trico Unbreak-
able Bottle Oiler is
made in 1, 2, and 4-
oz. capacities and can
be quickly installed
through the use of a
 $\frac{1}{8}$ -inch pipe thread
adapter furnished
with the unit. The
oiler illustrated here-
with is designed to
automatically lubri-
cate solid, wick, or
waste-packed bear-

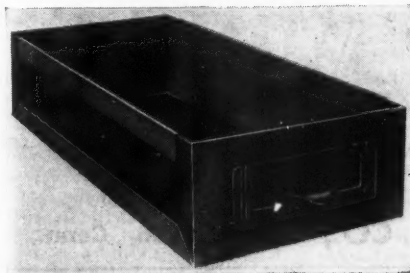
ings. The rod rides on the rotating shaft,
and the slightest vibration or vertical
movement provides for the release of oil
from the plastic bottle. In addition, as
the bearing heats, thermal action forces
oil on the bearing at a higher rate of feed.
The feed stops when the shaft is not in
motion. The correct amount of oil is said
to be evenly distributed to each bearing.

The construction of the oiler is such
that the oil supply is readily visible at
all times. The reservoir is made of un-
breakable plastic, and all metal parts of
the unit are bright cadmium plated for
attractive appearance and easy cleaning.
The bottle is readily removable for easy
and safe filling.

Bay Steel Shelf Box

A steel shelf box which is claimed to
provide an excellent means for storing
bolts, nuts, and other small parts is now
being manufactured by Bay Inc., 3015 N.
16th St., Philadelphia 32, Pa. The straight

Bay Steel Shelf Box



"KNOCK-OUT"

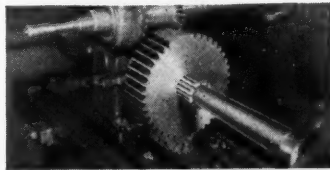
Expanding Mandrels

FOR TURNING—
GRINDING—
MILLING



This faster—simpler ex-
panding mandrel speeds production
on all types of operation. Sleeve
provides maximum bearing surface
for positive holding of work without
distortion or marring.

Ask your nearest Mill Supply House or Mail
the coupon TODAY.



Typical precision operation using
"Knock-Out" Expanding Mandrel

K. O. LEE CO. ABERDEEN,
S. DAKOTA

K. O. Lee Company
1114 First Ave. S. E., Aberdeen, So. Dak.

Please send us your illustrated bulletin on "K-O"
Expanding Mandrels.

Name

Address

City State

sides of the box allow for compact arrangement and maximum use of storage space. In addition, as a result of its smooth surfaces, the box can be removed or shifted with a minimum of effort.

Additional features of the Bay Steel Shelf Box include a label holder on the front to facilitate identification of contents and thus greatly speed material handling. The box is furnished with a baked green finish and is available in a variety of sizes.

Heim Self-Aligning Flanged Ball Bearing

A flanged ball bearing with a unique self-aligning feature is announced by The Heim Co., Fairfield, Conn. The bearing is a double-row type with an extended inner race for locking on the shaft and grooved outer races. According to the manufacturer, the bearing is so constructed that it compensates for misalignment and deflection of shafts and can even be used to overcome errors in the machining or mounting of parts.

The Heim Self-Aligning Flanged Ball Bearing is a completely self-contained unit which is designed for easy mounting and is said to retain its lubrication and

exclude dirt and foreign matter. The inner and outer races of the bearing are carefully machined and finished to close tolerances and heat treated. The unit is



Heim Self-Aligning Flanged Ball Bearing

said to accommodate axial thrusts in either direction and is designed for relatively light loads and medium speeds.



HOGGSON BRAND
Since 1849

**HAND-CUT
STEEL STAMPS
Letters & Figures**

Deep, hand-cut letters in special-formula steel—result of 90 years of die making—assure clean impressions and long service. Face of stamp is angled for extra strength. Ideal for parts and tool marking and numbering. Also made in reverse for marking molds and dies. At mill supply houses.

**Chamfered
corners
for
locating
the base.**

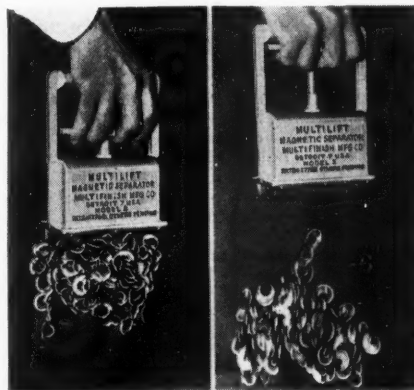


HOGGSON & PETTIS MFG. CO., New Haven, Conn.

Multilift Model S Magnetic Separator

Designated as the Multilift Model S, a load-releasing, lightweight, adjustable hand magnet of the permanent (non-electric) type has been introduced for the rapid handling of steel by the Multifinish Manufacturing Co., 2114 Monroe Ave., Dept. 199, Detroit 7, Mich. Completely self-powered and requiring no current, wires, or batteries, the unit is constructed for operation with one hand and is designed to lift up to 15 lb. The load is said to be instantly released when a finger-tip lever is raised.

Within the moisture - proof aluminum and stainless steel case of the Multilift



Multilift Model S Magnetic Separator

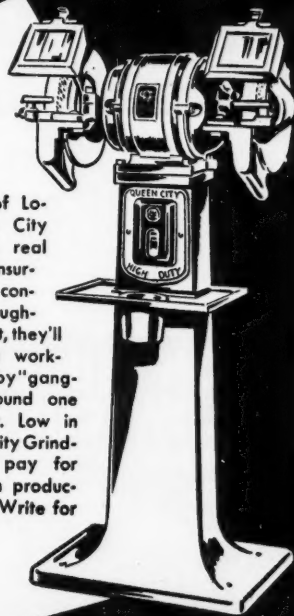
Model S Magnetic Separator are two 4-inch Alnico magnets which, it is claimed, will not lose their power regardless of the kind or length of use. The unit measures 3 x 5½ x 8 inches in size and weighs 3¾ lb. It is recommended for use in drawing steel parts from tumbling media; handling nuts, bolts, screws, nails, and small parts; separating stacked steel strips; removing heat-treated parts from carbon; handling hot or cold parts; separating steel from non-ferrous materials of many kinds; and salvaging steel parts or particles from aisles and assembly lines.

Congress Drill Stand

Designed to hold a complete set of drills, a drill stand featuring a large, non-tilting base and attractive baked gun-metal finish is now being manufac-

SAVE TIME, MONEY

with rugged
**QUEEN CITY
GRINDERS**

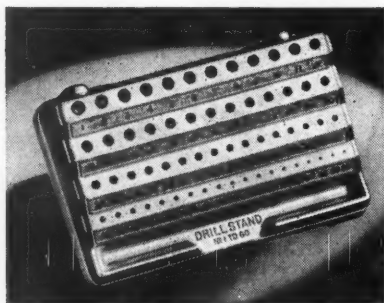


A battery of Low Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

QUEEN CITY
MACHINE TOOL CO.

233 E. 2nd St.,
CINCINNATI 2, OHIO

tured by the Congress Dies Casting Div., Detroit 12, Mich. The unit can be hung on a wall or used on a table or machine and includes a handy tray in front for holding drills to be sharpened.



Congress Drill Stand

The Congress Drill Stand is offered in two types; namely, No. 29 measuring 6½ x 4 inches for holding 29 drills from ⅜ to ½ inch, and No. 60 measuring 5¼ x 3¼ inches for holding 60 drills from Nos. 1 to 60.

HIGH QUALITY LOW COST

in Machine
Bases

After 65 years, we really know how! Lighter, stronger bases; entirely accurate; any size; no cost of molds or castings. Let us fabricate your bases.



LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, O.

"Silver Chip" No. 2 Universal Grinding Coolant

The development of a universal grinding coolant designated as "Silver Chip" No. 2 is announced by Machinery Lubricants, Inc., 31 St. James Ave., Boston 16, Mass. According to the manufacturer, the coolant can be effectively used in grinding steel, copper, aluminum, brass, cast iron, and other materials.

Use of Silver-Chip No. 2 Coolant is claimed to provide for clean grinding wheels and machines; the elimination of "burning" in using fine grit and hard grades of wheels; rust elimination; reduced wheel dressing; unusually smooth finishes; rapid chip settling, and so on. In addition, the coolant is said to be non-foaming and is translucent.

Airco Manual Heliweld Holder

A water-cooled manual Heliweld holder, designed for continuous production work with the insert-gas-shielded arc welding method, has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Features of the holder include an all-plastic exterior ip-



New NESTING TYPE
TOTE PANS

20" Long x 12"
Wide x 6¼" Deep
16 Ga., drag holes,
handles both ends.

J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.

CARROLL DIVIDING HEADS



Catalog
on
Request



3 SIZES - 4 MODELS - 6" to 12"

TROYKE MFG. CO.

4422 APPLETON ST. CINCINNATI 9, OHIO

al
rind-
ship"
ubri-
n 16,
urer,
d in
rass,
it is
ding
on of
hard
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ooth
on.
non-

ulated for maximum protection and efficient operation; a gas cap made of non-conducting material and a light, flexible cable encased in a durable, translucent plastic cover. The holder cable is sufficiently long to permit freedom of movement and rugged enough to withstand hard usage.

The Alrco Manual Heliweld Holder has a current capacity of 300 amperes, a.c. or d.c., and is fully insulated for high-frequency current which is often required for arc-starting and stabilization in welding.

Alnor Electronic Pyrometer Controller

An electronic pyrometer controller for the electronic heat control of furnaces, melting pots, kilns, and other heating devices using electricity, gas, or oil has



Alnor Electronic Pyrometer Controller

been added to the line of Alnor instruments marketed by Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Illinois.

Described as a precise instrument for both production and laboratory operations, the controller features a pyrometer movement double-pivoted on jeweled bearings; 6-inch easy-to-read mirrored scale; and dust-type and weatherproof case. A ruby "eye" indicates "on" and "off" conditions of heat supply.

UNIVERSAL DRILL BUSHINGS

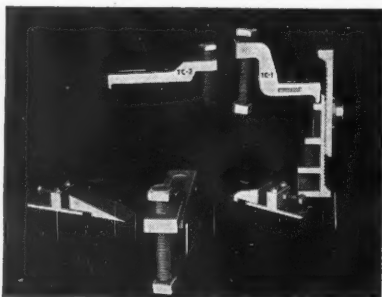
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been added to the line of Bridgeport products manufactured by the Hardware Sales Co., 1969 North Ave., Bridgeport 4, Conn.

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objects, the Bridgeport Adjustable Table Strap is sturdily made of bronze alloy having a tensile strength of 100,000 lb. per square inch.

Acromark Engraved Sign

Engraved brass, aluminum or stainless steel signs with letters engraved to .020-inch depth are now produced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. The slide type frame of the unit permits erection of the frame by means of screws or bolts after which the metal signs are slid into position and locked to prevent tampering or pilfering.

The engraved names may be long, because condensed lettering and any design may be engraved within available space. The frames can be made with any number of channels to receive signs of as many names as desired. Frames may be made of either wood or metal.

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New Books

How to Prepare and Maintain a Supervisors' Policy Manual (Research Report No. 21). By Eileen Ahern. Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 71 pages. Heavy paper covers. Price, \$3.00.

This study is intended primarily as a handbook for those charged with the preparation of supervisors' policy manuals, and brings together in compact form the practices of a number of companies which have had experience with manual programs. It deals, for the most part, with the actual techniques of collecting and appraising source material, writing the policies and procedures, coding and indexing them, and revising the manual as new material and changes develop.

The aim has been to enable the manual executive who must start from scratch to cut trial and error to a minimum, and make it unnecessary for him to collect manuals prepared by other companies. Both the advantages and disadvantages of various procedures, as they have worked out for other companies, are reported so that each may be judged from the viewpoint of the individual firm.

The contents of the report are divided into four principal sections which are headed as follows: A Supervisors' Policy Manual; An Aid to Top Management; Planning the Manual; Steps in Preparing the Manual; and Manual Distribution and Maintenance.

Controlled Atmospheres in Heat-Treatment. By G. T. Dunkley. Published by Pitman Publishing Corp., 2 W. 45th St., New York 19, N. Y. 70 pages. Illustrated. Cloth binding, board covers. Price, \$1.75.

Special atmospheres play an important part in the heat treatment of both ferrous and non-ferrous metals, and though much work remains to be done in developing new and more economical atmospheres, the results achieved up to the present time are nevertheless in many respects outstanding. This book provides a review of the uses of controlled atmospheres in industry at the present time. Methods of producing controlled atmospheres are described, and the elementary theory of the gas-metal reactions which occur is discussed.

The contents of the book are divided into five chapters which are headed as follows: Introduction; Types of Atmosphere; Commercial Atmospheres; Non-Ferrous Metals; and Ferrous Metals. An index is provided at the rear of the book.

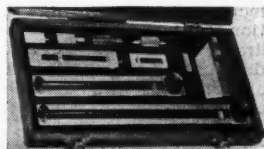
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Engineering Organization and Methods. By James E. Thompson. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 338 pages, 6 x 9 inches. 147 illustrations. Cloth binding, board covers. Price, \$4.00.

This book furnishes industrial executives and supervisors with tested techniques for speeding up production and reducing costs in product-design engineering departments. It offers a specific fundamental plan for organizing, operating, and controlling these departments and describes practical methods which have been used successfully in both large and small engineering sections of a wide variety of technical concerns.

Detailed discussions of both major and relatively minor considerations involved in the smooth and efficient organization and management of engineering departments are provided. Practical, usable information is supplied concerning such specific functions as production design; line organization; project system; organization charts; engineering liaison; selection of engineering methods; specification control; dash numbers; control of drawing numbers; job release procedure; drawing inventory control; issuing a stop order; correcting erroneous ADC; cost control; drawing cancellation; release of

company reports; specialized technical services maintaining the schedule; arrangement of reports; cost analysis, and so on. Where specific operations are described, the methods are said to represent the best current usage, based upon a study of methods used by many organizations and proved by successful application.

The book fully describes every form required for detail methods and provides examples of the proper usage of each. Forms shown in connection with general discussions are not treated in detail since they merely represent the "paper" required to implement a particular operation. The discussions of complex functions are concluded with a brief summary that provides the reader with an overall picture of the methods involved.

"How to Run a Lathe," 45th Edition. The South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., is now issuing the 45th edition of its lathe operator's handbook, "How to Run a Lathe." A number of changes in text material and illustrations have been made since the previous edition was printed in 1944.

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formation on the operation and care of metal-working lathes, and covers such subjects as the operation of the lathe units, grinding cutter bits, making accurate measurements, plain turning, chuck work, taper turning, boring, drilling, reaming, tapping, cutting screw threads, reference tables, and so on. Clearly and concisely written, the book is recommended not only for use by machinists but as a shop text in schools and apprentice training courses. It contains 128 pages, 5½ x 8 inches in size, and over 365 illustrations. Postpaid copies are available with paper covers for 25 cents (U. S. coin) or with leatherette covers for \$1.00.

Work Routing, Scheduling and Dispatching in Production. Third edition. By John Younger and Joseph Geschelin. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 168 pages. 56 illustrations. Cloth binding, board covers. Price \$3.50.

This volume is designed to aid production men in their prime task of getting each job underway smoothly and on time, carried through the proper channels of operation, and closed out on schedule, and then to bring the next job along promptly under a regularly paced yet

flexible plan of routing, scheduling, and dispatching. The book presents factors with which the production man will be directly concerned in deciding on operations, setting up job time tables, and following through to complete work in ample time to meet established delivery dates. The object has been to deal directly with the questions which come up most frequently in trying to get work through and to point the way to the most effective methods for solving production problems.

This third edition of a book first appearing under the title of "Work Routing" represents practically an entire rewriting to bring every chapter fully up to date in every respect. Most of the illustrations likewise are new and represent the most recent practices. Among the latest features are new case studies on mass production and descriptions of the new "process" machine method with master electrical controls.

The contents of the book are divided into 24 chapters which are headed as follows: Work Routing; Instruction Forms; Economics of Materials; Analysis of Operations; Importance of the Machine; Economics of Production Equipment; Economics of Mass Production; Lot Sizes; Interrelation of Work Routing,

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Standardization, and Cost Accounting; Cost Accounting for Planning; Coordination of Engineering and Production; Job Shop Planning; The Gantt Chart in Work Routing; Centralized Versus Decentralized Planning; Company Policies; Quality Control; Simulation; Tools, Jigs, and Fixtures; Planning from the Sales Curve; Materials Handling; Production Personnel; Planning the New Building; Planning for Expanding or Freezing Production; Rhythm in Manufacturing.

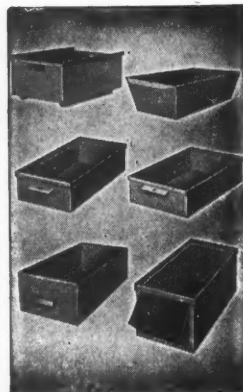
Running a Machine Shop. By Fred H. Colvin and Frank A. Stanley. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 521 pages. Illustrated. Cloth binding, board covers. Price \$4.25.

Designed to provide a wealth of specific management pointers that enable the machine shop owner or manager to achieve more efficient and profitable operation, this volume offers a complete and practical guide for effective practices for both large and small shops. It presents data ranging from methods of determining what kinds of jobs the shop can best handle to a complete toolroom system—

from an outline and analysis of shop operations and an example of wage payment plans to pointers on saving costs in selecting and using machines.

The book supplies tips for increasing profits in every shop operation. It tells how to set up and equip the shop, how to plan work, how to inspect and control it, where economies may be made, how production may be improved, how to keep records, how to manage the men—in short, how to adapt all of the best methods of shop operation to the reader's own setup, no matter what its size. For practical use, workable methods and suggestions have been taken from the practice of leading shops of all types and sizes.

This newly revised second edition features a special 40-page supplement covering improved techniques developed recently and including important new standards and methods. Fact-filled pages of practical information gleaned from wartime experience present particularly helpful pointers on job evaluating, rating, and rotation to prevent monotony, and to provide a more flexible working force; windowless shops; use of standard machine tools; shop and toolroom layout; uses of models as well as drawings; rate setting in a small shop, and so on.



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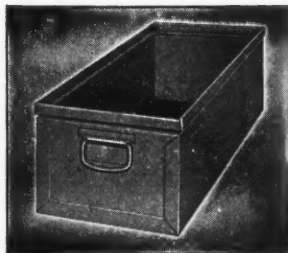
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New Shop Literature

Hannifin Standardized Hydraulic Presses. A 20-page illustrated bulletin listing a total of 75 standard presses in capacities ranging from 6 to 150 tons for use in performing straightening, forcing, forming, assembling, broaching, and similar operations is announced by the Hannifin Corp., 1101 S. Kilbourn Ave., Chicago 24, Ill. Detailed specifications and dimensions, together with information and recommendations on the selection of presses, are contained in the bulletin. Copy of Bulletin No. 1301 free to mechanical executives upon request.

Nolu Self-Lubricating Machinery Bearings. The Nolu Oilless Bearing Co., 18 E. Johnson St., Germantown, Philadelphia 44, Pa., has issued a six-page folder which illustrates and describes oilless bearings that are tooled from hardwood sections impregnated with a high grade lubricating oil. Applications of the bearings in household appliances, agricultural machinery, printing and paper machinery, conveying equipment, spinning machine, textile machines, and so on, are depicted and briefly discussed. Copy free upon request.

"Air-Operated Elements of Automatic Machinery" is the title of a folder published by The A. K. Allen Co., 3011 Ft. Hamilton Pkwy., Brooklyn 18, N. Y., which illustrates and describes dial feed tables that are designed to serve as shortcuts in the development of special automatic machinery. Accessories and special valves are also shown and described. In addition, the folder includes a price list of Allen air equipment, as well as application data on same. Copy free.

Whitman & Barnes Carbide Tipped Tools. Whitman & Barnes, 2108 W. Fort St., Detroit 16, Mich., has published a 28-page pocket-size catalog which lists and illustrates various types of carbide tipped tools, including straight and taper shank spiral fluted drills, core drills, masonry drills, glass drills, and drills for drilling hardened steel. Lathe centers, straight and taper shank chucking reamers, and shell reamers are also listed. In addition, several tools of standard as well as special design are illustrated. Moreover, the catalog contains information on the use and the care of carbide tipped tools, proper speeds, feeds, and grinding recommendations. Copy of Catalog No. 101 free upon request.

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Landis Tool Type F Plain Hydraulic Grinder. The Landis Tool Co., Waynesboro, Pa., has prepared a four-page bulletin describing its Type F Plain Hydraulic Grinder which can be furnished in sizes to swing work up to 14 or 16 inches in diameter and for grinding all types of heavy work weighing up to 6,500 lb. The lengths between centers range from 36 to 168 inches.

The bulletin illustrates all of the various features of the machine and includes condensed specifications of same. Copy free upon request.

Giddings & Lewis Handbook. The Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has prepared a 266-page handbook on horizontal boring, drilling, and milling machines, their accessories, and their application. The book, it is claimed, is strictly non-technical, and the information contained therein is applicable to general machining problems and is not limited to the horizontal boring machine field. The information presented in the book is said to have been very carefully selected from actual field performance facts and successful machining practices.

The contents of the book are conveniently divided into four tab-indexed sections as follows: Machine Fundamentals, Basic Operations, Work Methods, and Outstanding Applications. The book is of loose-leaf form so that new sections may be added in order to keep the book up to date.

The thirty chapters comprising the book offer the reader great detail regarding machining operations. Liberal use of action photographs, diagram and field time studies graphically shows advanced methods and ways of handling work.

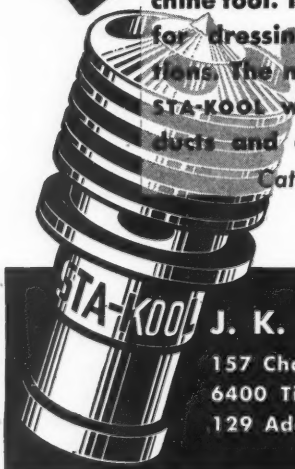
Each chapter presents a comprehensive story about a specific subject. The matter of boring feeds and speeds has been covered in detail. To present this information in concise and usable form, boring tools have been carefully described and well illustrated by line drawings.

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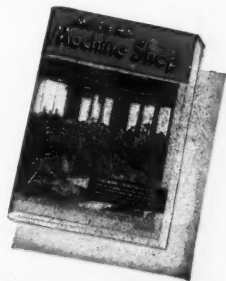
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The pages of MODERN MACHINE SHOP are designed to increase the size of advertisers' pocket-books — not their egos. Results tell the story. Gardner Publications, Inc., Cincinnati 2, Ohio.



Eureka Alloy Welding Electrodes. The Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich., announces a 12-page bulletin listing the following Eureka electrodes, their properties, recommended uses, the procedures for application: pure nickel electrodes, copper-nickel electrodes, "Drawalloy" electrodes, heat-resisting alloy electrodes, bronze electrodes, and copper electrodes. Copy free upon request.

"Grits and Grinds," Vol. 38, No. 11. This edition of the Norton technical house organ features an illustrated article on the finish grinding of porcelain insulators. In addition, the booklet contains an article on Stylon Micro-Cut Fibers for industrial use, as well as on Norbide Abrasive for lapping.

Copy of "Grits and Grinds," Vol. 38, No. 11 is available free from the Norton Co., Worcester 6, Massachusetts.

Carson-Newton Rotary Files. The Carson-Newton Co., Belleville 9, N. J., has published a 20 page catalog which provides illustrated, descriptive, and com-

plete tabular information, including list prices, on its line of Alligator Brand rotary files, both hand-cut and ground-from-the solid. Data on the company's file regrinding service are included, in addition to a complete index at the rear that conveniently lists the various types and designs of available files. Copy free upon request.

Natco A-65 Cam Feed Machines. The National Automatic Tool Co., Inc., Richmond, Ind., now has available a 12-page bulletin which presents interesting production records on Natco A-65 Cam Feed Machines for the mass production of small parts. Copy of Bulletin 547 free upon request.

Hammond Abrasive Belt Grinder-Polishers. Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich., now has available a bulletin illustrating and describing several models of abrasive belt grinder-polishers for grinding, polishing, chamfering, deburring, and removing fins on metals, plastics, ceramics, glass, and so on. Copy of Bulletin 319 free upon request.

Hammond "OK" and "No-Dust" Grinders for tool, snagging, and general purpose grinding operations are shown and described in a four-page bulletin prepared by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich. The features and advantages of each type of grinder are discussed and tables of specifications are provided. Copy of Bulletin 104 free upon request.

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Ingersoll-Rand Size 4U Electric Impact Tool. A four-page folder now being issued by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., fully illustrates and describes an electric impact tool which can be adapted for applying and removing nuts; drilling; reaming; tapping; driving and removing screws; driving and removing studs; extracting broken cap screws and studs; operating wire brushes; performing hole saw work; drilling brick and masonry; and driving wood augers. Copy free upon request.

Hammond Model C-4 Chip Breaker Grinder with capacity for all types of box and single point tools up to 2 inches is illustrated and described in a bulletin published by Hammond Machinery Builders, Inc., Dept. GP-21, 1615 Douglas Ave., Kalamazoo 54, Mich. Copy of Bulletin No. 217 free upon request.

Shell's Spiral Grip Non-Slip Collets. The Shell Machine Co., 21306 John R St., Hazel Park, Mich., now has available a catalog which presents illustrated, descriptive, and complete tabular data, including prices, on spiral grip non-slip collets for all automatic and hand screw machines. Copy of Catalog No. 48 free upon request.

"The Diamond-Miser," a device that is designed to hold a diamond tool against a grinding wheel in such a way as to produce a uniform rotation of the diamond and cause a new cutting face to be presented to the wheel with each pass, is illustrated and described as to features, installation, available models, and so on, in a four-page bulletin now being distributed by Diamond-Detroit, Inc., 8-270 General Motors Bldg., Detroit 2, Mich. Copy free upon request.

Tree Taper-Boring Tool, a unique boring tool for the milling machine, jig borer, and boring bar, is illustrated and described in a four-page bulletin released by the Tree Tool and Die Works, Racine, Wis. The bulletin shows how the tool can be adapted to perform straight boring, facing and outside turning operations with a single setup. Copy free.

"Injury in Ground Surfaces" is the title of a 76-page pocket-size booklet published by the Norton Co., Worcester 6, Mass. Written by Dr. L. P. Tarasov of the Norton Research Laboratories, the booklet features many illustrations which clearly show the numerous types of defects, such as cracks and burns, that are sometimes found in ground surfaces.

Written for individuals concerned with the practical aspects of grinding, the booklet should provide helpful information to makers of tool steel, tools, dies, and hardened steel parts. In addition, the booklet is said to appeal to metallurgists having to deal with injury in ground surfaces since it presents in detail up-to-date information on the detection of injury and how to proceed in trouble shooting. Copy free upon request.

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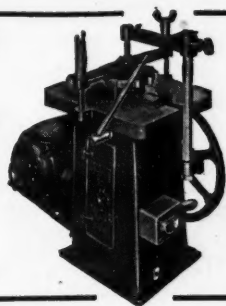
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The Vulcanaire, a precision grinding unit which can be used on most types of jig borers, vertical milling machines, horizontal milling machines, boring mills, lathes, surface grinders, internal grinders, and drill presses, is fully illustrated and described in a six-page folder prepared by The Vulcan Tool Co., 730 Lorain Ave., Dayton 10, Ohio. Several typical applications of the unit are shown and discussed. Copy free upon request.

Barth Metal-Working Machines and Tools. The Barth Manufacturing Co., Milldale, Conn., has prepared a 40-page catalog which presents illustrated, descriptive, and tabular data on a complete line of metal-working machines and tools, including squaring shears, bar and rod shears, slitting and rod shears, forming machines, bar folders, beading machines, rotary and combination bench machines, grooving machines, crimping and beading machines, ring and circle shears, brace and wire benders, bench standards, bench plates, stakes, rivet sets and headers, grooving tools, chisels, punches, awls, screw drivers, squares, drill stands, slitting and crimping machines, and so on. Copy of Catalog No. 6 free upon request.



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Hardinge WE59 High Speed Precision Lathe with variable speed drive and free-spindle clutch, designed for working to extremely close tolerances and finished specifications in toolrooms, laboratories, and development departments, is illustrated and described in a bulletin now available free from Hardinge Brothers, Inc., Elmira, New York.

Whiton Steam Turbines. An eight-page fully illustrated catalog on a solid rotor type steam turbine has been released by The Whiton Machine Co., New London, Conn. The catalog shows in detail the many engineering features of the product and includes engineering drawings and dimensional data for use in selecting the size and type of turbine needed for specific applications. Copy of Catalog No. SE101 free upon request.

Erickson-State Boring and Reaming Tool is illustrated and described in a bulletin prepared by the Erickson Tools Division, 2309 Hamilton Ave., Cleveland 14, Ohio. Similar data are also provided on the Erickson-State Adjustable Core Drill for applications involving excessive chip problems. Copy free upon request.

Kaukauna Portable Horizontal Machines for drilling and tapping from practically any location with the machine spindle in almost any position are shown and described in an eight-page catalog published by the Kaukauna Machine Corp., Kaukauna, Wis. The catalog includes data on models having tilting and universal head construction. General specifications and operating details are tabulated. Copy free upon request.

Westinghouse Axiflo Fans. An eight-page color booklet describing the performance of Westinghouse Axiflo Fans suitable for high temperature applications has been released by the Westinghouse Electric Corp., P. O. Box 863, Pittsburgh 30, Pa. Complete with pictures of the various models available in either the elbow or straight-throw type, the booklet explains how the unique cone arrangement and other features, including low maintenance and ease of installation, make the fans suitable for such applications as air conditioning systems, heating and ventilating, dust and fume removal, equipment and machinery cooling, heat treating non-ferrous metals, and industrial drying and processing. Copy of Booklet B-3804 free upon request.

Hobart Electrode Wall Chart. A 25 x 35-inch electrode wall chart attractively printed in full color has been published by The Hobart Bros. Co., Hobart Square, Troy, Ohio. The chart shows procedures for every type of arc welding electrode; actual results of too long or too short an arc, too much or too little welding heat, and too fast or too slow a welding speed; a perfect bead, as well as a cross section of all welds; and complete welding symbols for both fusion and resistance welding. Copy free upon request.

M & N 30-Ton Electric Hot Plate Molding Press for rubber and plastics is the subject of a four-page two-color folder released by the M & N Machine Tool Works, Inc., 144 Orono St., Clifton, N. J. Construction features of the unit are fully discussed in the folder, copy of which is available free upon request.

PRCo Type BAA Anderometer for the specification of bearing quality and rapid receiving inspection is the subject of a bulletin issued by the Physicists Research Co., 321 S. Main St., Ann Arbor, Mich. The bulletin describes the functions of the various units comprising the Anderometer, explains how the instrument operates, and outlines the advantages it offers to both purchasers and manufacturers of ball bearings. Detailed specifications are included. Copy free.

Metco Sprabond, a metal which may be sprayed directly onto smooth, even highly polished, steel and many other materials without any surface preparation, is described in an illustrated bulletin issued by the Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y. Copy of Bulletin 57 free upon request.

Physicists Type RA Rotary Piloting Fixture, which is designed to provide the tracing motion needed for making surface roughness measurements with the Profilometer around internal and external surfaces of rotation such as cylinders, spheres, and toroids and on circular flat surfaces such as rings, grooves, and bosses, is illustrated and described in a bulletin announced by the Physicists Research Co., 321 S. Main St., Ann Arbor, Mich. Copy free upon request.

Ingersoll Cutter Grinder. A 48-page plastic-bound cutter grinder bulletin intended as an operator's instruction manual and as a repair and maintenance guide has been published by The Ingersoll Milling Machine Co., Rockford, Ill. The bulletin illustrates and describes the wide application of the Ingersoll Cutter Grinder and explains in detail the procedure for sharpening milling cutters with carbide, cast alloy, or high speed steel blades. Recommended grinds for various types of face mills used on different types of material are listed.

Copy of Bulletin No. 57 is available free to mechanical executives addressing requests on their company letterheads.



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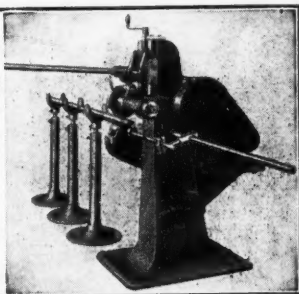
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Hydro-Line Hydraulic Cylinders. To simplify the efforts of the engineer in determining the type and size of hydraulic cylinder best suited for the intended application the Hydro-Line Manufacturing Co., 711 19th St., Rockford, Ill., has published a 28-page catalog covering its entire line of standard hydraulic cylinders which are available in a range of sizes from 1½ through 8-inch bore in various types of mountings. The catalog provides complete details on the construction features of the cylinders, as well as their dimensions. An area volume and velocity chart and area force and pressure chart are included at the rear of the catalog.

Copy of Catalog H-47 is available free to mechanical executives addressing requests on their company letterheads.

M & N Hobbing Presses. Illustrated two-color four-page folders describing its hobbing presses for blanking, forming, and drawing heavy materials, testing materials for compression, experimental work on plastics, rubber, and powder metallurgy, and so on, are now available free from the M & N Machine Tool Works, Inc., 144 Orono St., Clifton, N. J.

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Michigan Model No. 933 Universal Duplex Lapper for lapping gears ranging from 2½ to 20 inches in diameter and clusters up to 30 inches in length is described in a bulletin issued by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Complete specifications of the unit are included. Copy of Bulletin No. 993-47 free upon request.

"How to Get the Most Value with Ozalid" is the title of a 52-page booklet prepared by Ozalid, Division of General Aniline and Film Corp., Johnson City, N. Y., the purpose of which is to familiarize the reader with Ozalid copying and printing machines and to suggest ways to save time, labor, and materials by using them effectively. Copy free to mechanical executives upon request.

Oberdorfer Series "50" Pumps. The Industrial Pump Division, Oberdorfer Foundries, Inc., Syracuse, N. Y., has prepared a line of corrosion-resistant all-bronze industrial pumps for use wherever liquids must be moved from one location to another under pressure. Tables showing capacity curves for the pumps are included in the booklet, copy of which is available free upon request.

Detroit Circularity Grinding Attachment for grinding form relief, radial relief, or both at once is covered as to details of operation and construction in a four-page bulletin released by the Detroit Reamer and Tool Co., 2830 E. Seven Mile Rd., Detroit 12, Mich. In addition to a complete description of the working principle and the simple method of setting up the attachment, the bulletin includes diagrams showing how types or combinations of relief are ground. Copy free upon request.

Gillen Machine Keys, Woodruff Keys, and Taper Pins are featured in a catalog and price list prepared by John Gillen Co., Inc., 2542 S. 50th Ave., Cicero 50, Ill. In addition, to illustrated, descriptive, and tabular data on standard machine keys, Woodruff keys, and taper pins, the catalog includes illustrations and descriptions of special keys and machine parts. Copy free to mechanical executives addressing requests on their company letterheads.

Carboloy Carbide Die Engineering Manual. A comprehensive manual covering the design, fabrication, application, and maintenance of carbide sheet metal dies has been published by the Carboloy Co., Inc., 11143 E. 8 Mile Blvd., Detroit 32, Mich. Designed specifically for the use of die manufacturers and large scale users of carbide dies, the manual contains 36 pages of technical data accompanied by scores of illustrations, so arranged as to provide for maximum day-to-day usefulness. Considerable general information has been compiled and condensed into the first two sections of the manual, headed respectively.

"What Is Carboloy Cemented Carbide" and "Typical Applications of Carboloy Sheet Metal Dies and Punches." These two sections are followed by individual, profusely illustrated treatments on the designing, assembling and finishing of draw dies, a similar treatment on blanking dies, a section on the designing and finishing of punches, and an enumeration of the factors involved in ordering carbides for dies and punches, including tolerance specifications.

Dimensional information as required for the manufacture of dies and punches of various sizes and types is presented in tabular form in the various sections. Methods of finishing dies of different hole sizes are extensively covered in the draw die section. The latter section also covers general considerations with regard to die sets, alignment, rigidity, and press requirements. Copy of Manual D-124 free.

Lyon Steel Equipment. Lyon Metal Products, Inc., Aurora, Ill., has prepared an 80-page bulletin which presents illustrations, descriptions, and tabular information on its complete line of steel equipment for factories, offices, shops, warehouses, and so on. Products covered include cabinets, folding chairs, stools, desks, toolboxes, workbenches, tool stands, shop boxes, bar racks, shelving, tool storage equipment, lockers, display equipment, ironing tables, and conveyors.

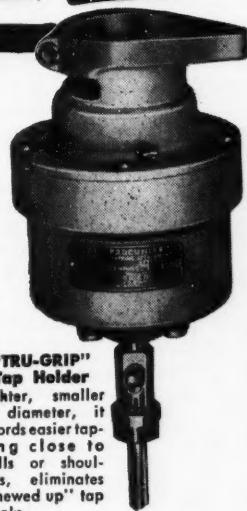
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"Grits and Grinds" Vol. 38, No. 12. "Do's and Dont's on Using Diamond Wheels" is the title of the lead article in this edition of the technical house organ published by the Norton Co., Worcester 6, Mass. Additional articles included in the booklet are entitled "Serviceability—A Keynote in New Machine Design" and "32 Alundum—A Prediction That Came True." Copy of "Grits and Grinds" Vol. 38, No. 12 free upon request.

Throatless Handishear, a dual-purpose shearing device with capacity for 14 gauge mild steel and 18 gauge stainless steel, is illustrated and described in a bulletin now being distributed by the Mechanical Service and Manufacturing Co., 7143 S. Racine Ave., Chicago 36, Ill. Copy free upon request.

"Light Duty—Low Air" Metallizing Gun. A four-page, comprehensive bulletin now being issued by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., describes and illustrates the Metco Type L Metallizing Gun which is said to operate on only 10 cubic feet of air. The gun can be used to spray such metals as babbitt, bronze, carbon steel, stainless steels, and zinc, by hand or machine mounting. With the Metco Type L, met-

allizing operations can be performed on shafts, bores, tanks and numerous other kinds of workpieces.

Copy of Bulletin 55 is available free upon request.

Lyon Gravity Roller Conveyors. Lyon Metal Products, Inc., Aurora, Ill., is now issuing a four-page folder which illustrates and describes its line of gravity roller conveyors for use in receiving rooms, on production lines, and so forth. Copy free upon request.

"An Introduction to Job Evaluation." From a practical standpoint, job evaluation can be a positive force in better employee relations by providing a logical basis for promotions and transfers, as well as by assuring employees that their time and talents are not wasted and that they are receiving equal pay for equal work. This is one of the facts pointed out by the report, "An Introduction to Job Evaluation," published by the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N. Y. The purpose of the report is to provide executives of Metropolitan Group-insured companies a simplified explanation of job evaluation from the practical standpoint of the problems faced by management. It points out the reasoning processes on which job evaluation is based, requirements of a successful program, the steps involved, and the pitfalls commonly encountered.

Among the subjects covered by the report are background of job evaluation; methods of job evaluation; basic thinking processes; organizing for job evaluation; steps in job evaluation pitfalls; job evaluation in the small company; and informing employees on job evaluation. Copy of the report is available to executives addressing requests on their company letterheads.

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"Over-Hauling Pension and Profit-Sharing Plans" is the title of a 32-page pamphlet which has been added to its Financial Management Series by the American Management Association, 330 W. 42nd St., New York 18, N. Y. Written by Meyer M. Goldstein, Director, Pension Planning Company of New York, the pamphlet discusses the overhauling of pension plans in the four areas of benefits, membership, costs, and funding methods.

A copy of the pamphlet, Financial Management Series No. 83, is available at a price of 50 cents each.

"Depreciation Policy and the Postwar Price Level" is the title of a 28-page pamphlet published by the Machinery and Allied Products Institute, 120 S. La Salle St., Chicago 3, Ill. The pamphlet considers the effect on depreciation policy of the average rise of 50 per cent in the price level for all capital goods (equipment and construction) which has taken place since 1939 and marks another effort to increase public understanding of the relationship of price movements to our economy. The pamphlet is designed primarily to state the problem and to explore various ways

of dealing with it. It indicates serious under-depreciation of fixed assets acquired before the war at lower than present price levels. It indicates further that because of this under-depreciation American industry may be understating its qualities, overstating its profits, and (in many cases) underpricing its product.

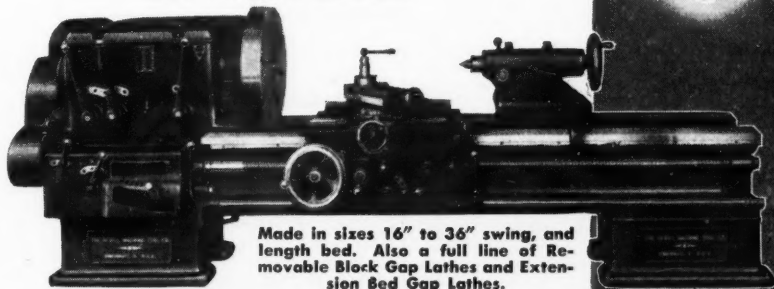
The pamphlet should be of vital interest alike to top executives in industry, to the accounting and engineering professions, and to legislators and tax administrators, as well as to economists and other professional students of our business system. Copy is available at a price of 25 cents.

"An Outline of the Supervisor's Job" is the title of an article by John M. Pfiffner, Professor of Public Administration, University of Southern California, which is now being offered in the form of a 20-page reprint by the American Management Association, 30 W. 42nd St., New York 18, N. Y. Of particular interest to training directors and executives concerned with the development of foremen in their management functions, the reprint is available at a price of 25 cents per copy. Quantity prices can be obtained on request.

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Vinco Automatic Center Punch and Accessories. A 12-page pocketsize catalog now available from Vinco Products, Asbury Park, N. J., illustrates and discusses automatic center punches for precision layout work, hole punching, and so on. Also illustrated and described are various accessories for the punch units which adapt them to hole cutting, chiseling, marking, hammering, nail setting, and other operations. Copy of Catalog No. 8 is free upon request.

Max-Well Recessing Tools. The Max-well Co., 386 Broadway, Bedford, Ohio, announces a two-color illustrated brochure describing a line of recessing tools adaptable to drill presses, boring mills, turret lathes, automatics, milling machines, and so on. The brochure includes detailed drawings illustrating various types of recessing, back-facing, and grooving operations which can be accurately performed with the tools. In addition, the brochure contains engineering and specification data covering tool shanks, driving sleeves, cutter blocks, pilot retaining collars, pilots, and cutters. Tools are shown in four different sizes and their individual capacity are charted and prices are given. Copy of Brochure No. R-246 free upon request.

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21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
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Over the Editor's Desk

The Problem—and the Solution

THE Auto Workers' Union has presented demands for a new wage increase which again will set a pattern for similar demands in other American industries and thus add fuel to the flames of inflation which are destroying our American economy.

The automobile workers' wage rate is near the top in American wage scales, and very much higher than the scale in many other industries. But the market for automobiles is far from saturated; the demand is urgent, and Walter Reuther very evidently feels that this is a strategic time to obtain for his auto workers a substantial wage increase—which must, of course, come out of the pockets of all of those who have to buy automobiles. Whether or not the wage-increase paid to the auto workers will force America farther along the road to disaster seems to be beside the point; all the Auto Workers' Union seems to be interested in is a substantial increase in the pay of its members. They are not interested in the future of the country.

Again the writer of this editorial says, as he said in January 1946, that it is possible to pay the automobile workers an increased wage without increasing the cost of the product. It can be done by basing the present pay rate on present production as evidenced by past records and setting up an incentive system by which the worker's pay will be increased in exact proportion to the amount of increase in his production.

Plants in which good incentive systems are in operation will be found to be operating more efficiently, more economically, paying higher wages and selling their product at lower prices than similar plants which do not have incentive systems. An efficient wage incentive system is the answer to the demand for higher wages and the corresponding necessity for the lower unit costs. It was a mistake for the automobile manufacturers to abandon the incentive systems in the first place; it will be a mistake if they do not reinstate such systems. And the country as a whole will pay for that mistake.

Howard Campbell

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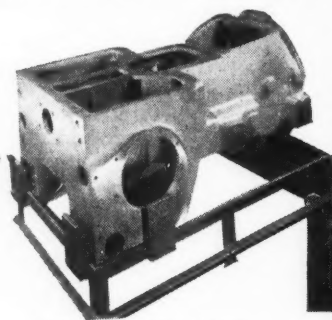
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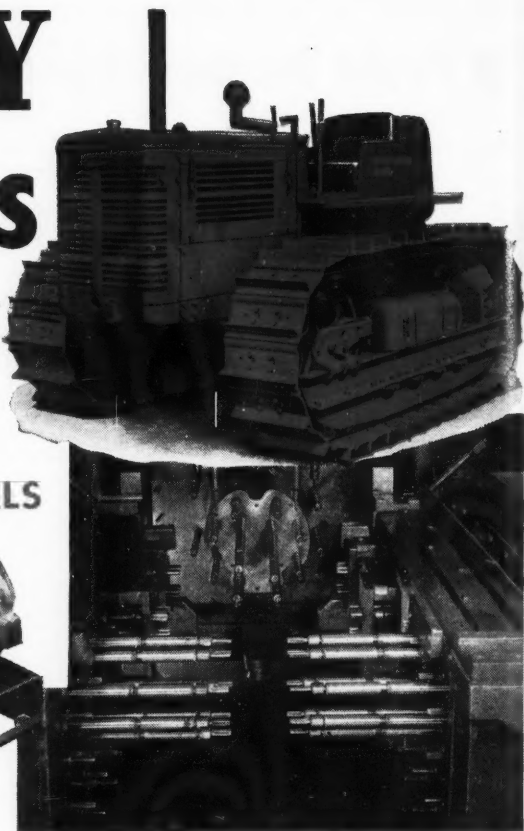
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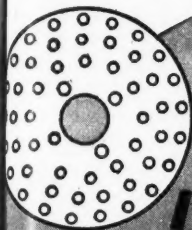
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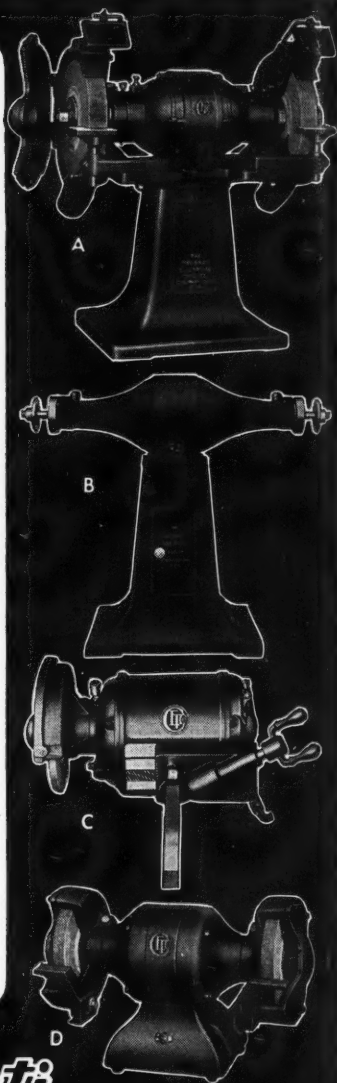
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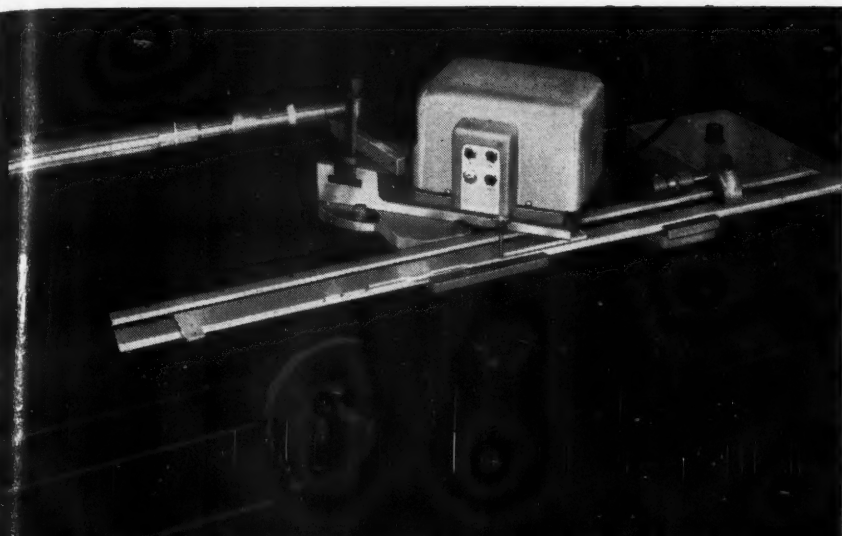
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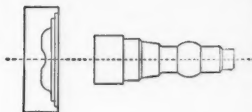
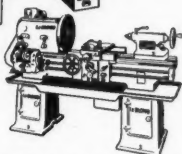
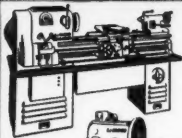
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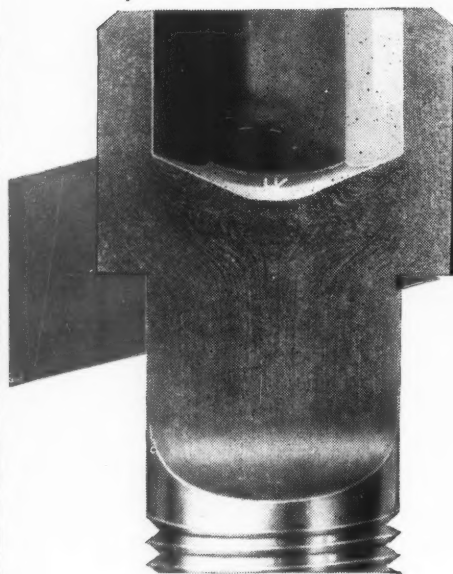
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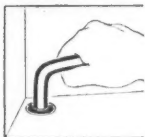


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